

Access DB# \_\_\_\_\_

**SEARCH REQUEST FORM**

Scientific and Technical Information Center

Requester's Full Name: Michelle Davis Examiner #: 78462 Date: 1-8-01  
 Art Unit: 1642 Phone Number 303-6410 Serial Number: 071444763  
 Mail Box and Bldg/Room Location: CM1 4401 Results Format Preferred (circle): PAPER DISK E-MAIL

8001  
 If more than one search is submitted, please prioritize searches in order of need.

\*\*\*\*\*

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: Diagnostic Agents and Remedies for malignant TumorsInventors (please provide full names): Tohru Tanaka and Hiroshi SasakiEarliest Priority Filing Date: 6-18-97

\*For Sequence Searches Only\* Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.

Please search 5-aminolevulinic acid  
 which may be an ester, amide, salt hydrate  
 or selvate and contains a carbon and/or  
 nitrogen isotope.

BEST AVAILABLE COPY

Point of Contact:  
 Barb O'Bryen  
 Technical Info. Specialist  
 CM1 12014 Tel: 303-4291

\*\*\*\*\*  
STAFF USE ONLY

## Type of Search

## Vendors and cost where applicable

Searcher: <u>12713</u>	NA Sequence (#) _____	Dialog <u>2-11</u>
Searcher Phone #: _____	AA Sequence (#) _____	Questel/Orbit _____
Searcher Location: _____	Structure (#) <u>4</u>	Dr.Link _____
Date Searcher Picked Up: _____	Bibliographic _____	Lexis/Nexis _____
Date Completed: <u>1-16-01</u>	Litigation _____	Sequence Systems _____
Searcher Prep & Review Time: <u>28</u>	Fulltext _____	WWW/Internet _____
Clerical Prep Time: _____	Patent Family _____	Other (specify) _____
Online Time: <u>15</u>	Other _____	

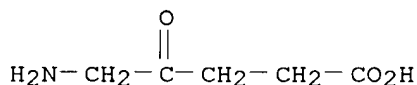


=> fil lreg; d ide l1

FILE 'LREGISTRY' ENTERED AT 16:34:07 ON 16 JAN 2001  
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.  
PLEASE SEE "HELP USAGETERMS" FOR DETAILS.  
COPYRIGHT (C) 2001 AMERICAN CHEMICAL SOCIETY (ACS)

LREGISTRY IS A STATIC LEARNING FILE

L1 ANSWER 1 OF 1 COPYRIGHT 2001 ACS  
RN 106-60-5 LREGISTRY  
CN Pentanoic acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)  
OTHER CA INDEX NAMES:  
CN Levulinic acid, 5-amino- (8CI)  
OTHER NAMES:  
CN .delta.-Aminolevulinic acid  
CN **5-Aminolevulinic acid**  
CN Aminolevulinic acid  
FS 3D CONCORD  
MF C5 H9 N O3  
CI COM  
LC STN Files: ADISINSIGHT, AGRICOLA, AIDSLINE, ANABSTR, BEILSTEIN\*,  
BIOBUSINESS, BIOSIS, BIOTECHNO, CA, CABA, CANCERLIT, CAOLD, CAPLUS,  
CASREACT, CBNB, CEN, CHEMCATS, CHEMINFORMRX, CHEMLIST, CIN, CSNB, DDFU,  
DIOGENES, DRUGU, EMBASE, IFICDB, IFIPAT, IFIUDB, IPA, MEDLINE, MRCK\*,  
NAPRALERT, NIOSHTIC, PHAR, PIRA, PROMT, TOXLINE, TOXLIT, USPATFULL  
(\*File contains numerically searchable property data)  
Other Sources: EINECS\*\*, NDSL\*\*, TSCA\*\*  
(\*\*Enter CHEMLIST File for up-to-date regulatory information)



*structure of 5-amino levulinic acid*

=> fil reg; d stat que 115; fil cap1; d que nos 116

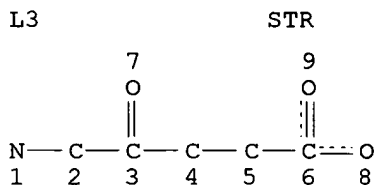
FILE 'REGISTRY' ENTERED AT 16:44:13 ON 16 JAN 2001  
 USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.  
 PLEASE SEE "HELP USAGETERMS" FOR DETAILS.  
 COPYRIGHT (C) 2001 American Chemical Society (ACS)

STRUCTURE FILE UPDATES: 15 JAN 2001 HIGHEST RN 314018-37-6  
 DICTIONARY FILE UPDATES: 15 JAN 2001 HIGHEST RN 314018-37-6

TSCA INFORMATION NOW CURRENT THROUGH July 8, 2000

Please note that search-term pricing does apply when  
 conducting SmartSELECT searches.

Structure search limits have been increased. See HELP SLIMIT  
 for details.



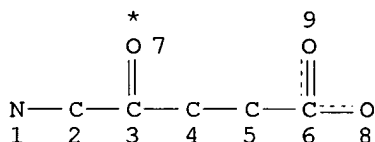
*all hydrogens removed from  
 structure to allow for esters, amides, etc*

NODE ATTRIBUTES:  
 DEFAULT MLEVEL IS ATOM  
 DEFAULT ECLEVEL IS LIMITED

*full file search done  
 on this structure*

GRAPH ATTRIBUTES:  
 RING(S) ARE ISOLATED OR EMBEDDED  
 NUMBER OF NODES IS 9

STEREO ATTRIBUTES: NONE  
 L4 SCR 2039 - *abnormal mass - all isotopic specifications*  
 L6 SCR 2045 OR 2046 - *hydrogen isotopes (excluded from answer set)*  
 L8 35 SEA FILE=REGISTRY SSS FUL L3 AND L4 NOT L6  
 L11 STR

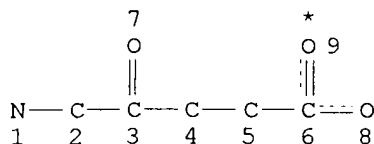


*the following 3 structures L11, L12, L13  
 were removed from the  
 answer set (all contain  
 isotopic oxygen)*

NODE ATTRIBUTES:  
 MASS IS \* AT 7  
 DEFAULT MLEVEL IS ATOM  
 DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
 RING(S) ARE ISOLATED OR EMBEDDED  
 NUMBER OF NODES IS 9

STEREO ATTRIBUTES: NONE  
 L12 STR



## NODE ATTRIBUTES:

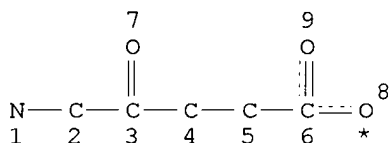
MASS IS \* AT 9  
 DEFAULT MLEVEL IS ATOM  
 DEFAULT ECLEVEL IS LIMITED

## GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED  
 NUMBER OF NODES IS 9

## STEREO ATTRIBUTES: NONE

L13 STR



## NODE ATTRIBUTES:

MASS IS \* AT 8  
 DEFAULT MLEVEL IS ATOM  
 DEFAULT ECLEVEL IS LIMITED

## GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED  
 NUMBER OF NODES IS 9

## STEREO ATTRIBUTES: NONE

L15 29 SEA FILE=REGISTRY SUB=L8 SSS FUL (L3 NOT ((L11 OR L12 OR L13)))

100.0% PROCESSED 35 ITERATIONS  
 SEARCH TIME: 00.00.01

29 ANSWERS

FILE 'CAPLUS' ENTERED AT 16:44:14 ON 16 JAN 2001  
 USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.  
 PLEASE SEE "HELP USAGETERMS" FOR DETAILS.  
 COPYRIGHT (C) 2001 AMERICAN CHEMICAL SOCIETY (ACS)

Copyright of the articles to which records in this database refer is held by the publishers listed in the PUBLISHER (PB) field (available for records published or updated in Chemical Abstracts after December 26, 1996), unless otherwise indicated in the original publications.

FILE COVERS 1967 - 16 Jan 2001 VOL 134 ISS 4  
 FILE LAST UPDATED: 15 Jan 2001 (20010115/ED)

This file contains CAS Registry Numbers for easy and accurate substance identification.

Searched by Barb O'Bryen, STIC 308-4291

This file supports REGISTRY for direct browsing and searching of all substance data from the REGISTRY file. Enter HELP FIRST for more information.

Now you can extend your author, patent assignee, patent information, and title searches back to 1907. The records from 1907-1966 now have this searchable data in CAOLD. You now have electronic access to all of CA: 1907 to 1966 in CAOLD and 1967 to the present in CAPLUS on STN.

The CA Lexicon is now available in the Controlled Term (/CT) field. Enter HELP LEXICON for full details.

Attention, the CA Lexicon is the copyrighted intellectual property of the American Chemical Society and is provided to assist you in searching databases on STN. Any dissemination, distribution, copying, or storing of this information, without the prior written consent of CAS, is strictly prohibited.

L3 STR  
L4 SCR 2039  
L6 SCR 2045 OR 2046  
L8 35 SEA FILE=REGISTRY SSS FUL L3 AND L4 NOT L6  
L11 STR  
L12 STR  
L13 STR  
L15 29 SEA FILE=REGISTRY SUB=L8 SSS FUL (L3 NOT ((L11 OR L12 OR L13)))  
L16 45 SEA FILE=CAPLUS ABB=ON L15

=> d ibib abs hitstr l16 1-45; fil cao; d que nos l17

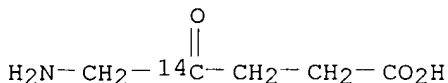
*display format prints Registry records after matching citations*

L16 ANSWER 1 OF 45 CAPLUS COPYRIGHT 2001 ACS  
ACCESSION NUMBER: 1999:235942 CAPLUS  
DOCUMENT NUMBER: 131:167488  
TITLE: Biosynthesis of porphyrins and related macrocycles.  
Part 51. Proof that a reductive step occurs during the biosynthesis of vitamin B12 by the microaerophilic organism, *Propionibacterium shermanii*  
AUTHOR(S): Ichinose, Koji; Kodera, Masahito; Leeper, Finian J.; Battersby, Alan R.  
CORPORATE SOURCE: University Chemical Laboratory, Cambridge, CB2 1EW, UK  
SOURCE: J. Chem. Soc., Perkin Trans. 1 (1999), (8), 879-888  
CODEN: JCPRB4; ISSN: 0300-922X  
PUBLISHER: Royal Society of Chemistry  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
AB 5-Amino[4-13C]levulinic acid was synthesized for enzymic conversion into 13C-labeled precorrin-2. This was incubated with an enzyme system from *P. shermanii* in the presence of [4-2H2]NADH and [4-2H2]NADPH to yield cobyrinic acid, shown to carry 2H at C-19 by appropriate 13C-NMR studies. The same reducing cofactors but now stereospecifically labeled at C-4 with 3H were similarly used to biosynthesize cobyrinic acid which was 3H-labeled from the 4(R)-cofactors but carried no 3H when the 4(S)-cofactors were used. Suitable degradn. of the cobyrinic acid after conversion into its ester proved 3H-labeling at C-19. These results establish that the biosynthesis of vitamin B12 in the microaerophilic organism *P. shermanii* involves a reductive step in which a reductase enzyme transfers 4-HR of the cofactor to C-19 of the macrocycle.  
IT 16387-80-7P 129720-94-1P  
Searched by Barb O'Bryen, STIC 308-4291

RL: SPN (Synthetic preparation); PREP (Preparation)  
(prepn. of)

RN 16387-80-7 CAPLUS

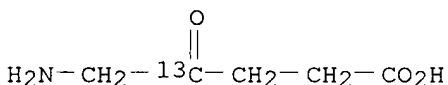
CN Pentanoic-4-<sup>14</sup>C acid, 5-amino-4-oxo-, hydrochloride (9CI) (CA INDEX NAME)



⊙ HCl

RN 129720-94-1 CAPLUS

CN Pentanoic-4-<sup>13</sup>C acid, 5-amino-4-oxo-, hydrochloride (9CI) (CA INDEX NAME)



⊙ HCl

REFERENCE COUNT:

29

REFERENCE(S):

- (1) Abell, C; J Chem Soc Chem Commun 1981, P856 CAPLUS
- (2) Balachandran, S; J Chem Soc Perkin Trans 1 1994, P487 CAPLUS
- (3) Bartels, G; Liebigs Ann Chem 1979, P1440 CAPLUS
- (6) Battersby, A; J Chem Soc Chem Commun 1984, P527 CAPLUS
- (7) Battersby, A; J Chem Soc, Perkin Trans 1 1977, P158 CAPLUS

ALL CITATIONS AVAILABLE IN THE RE FORMAT

L16 ANSWER 2 OF 45 CAPLUS COPYRIGHT 2001 ACS

ACCESSION NUMBER: 1999:9731 CAPLUS

DOCUMENT NUMBER: 130:78111

TITLE: Diagnostic agents and remedies for malignant tumors

INVENTOR(S): Tanaka, Tohru; Sasaki, Hiroshi

PATENT ASSIGNEE(S): Cosmo Research Institute, Japan; Cosmo Oil Co., Ltd.

SOURCE: PCT Int. Appl., 23 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9857668	A1	19981223	WO 1998-JP2648	19980616
W: CA, NO, US				
RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
JP 11012197	A2	19990119	JP 1997-160945	19970618
EP 995448	A1	20000426	EP 1998-924643	19980616
R: DE, FR, GB				
NO 9906253	A	20000218	NO 1999-6253	19991216
Searched by Barb O'Bryen, STIC 308-4291				

## PRIORITY APPLN. INFO.:

JP 1997-160945 19970618  
 WO 1998-JP2648 19980616

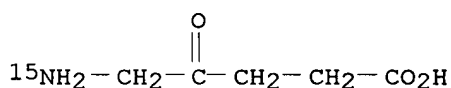
AB Diagnostic agents or photodynamic remedies for malignant tumors contg. as the active ingredient compds. wherein at least one carbon atom of 5-aminolevulinic acid is a carbon isotope or the nitrogen atom in the amino group thereof is a nitrogen isotope, esters, amides or salts of these compds. or hydrates or solvates thereof.

IT 60556-69-6P 79503-87-0P

RL: BAC (Biological activity or effector, except adverse); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); PREP (Preparation); USES (Uses)  
 (radioisotope-labeled 5-aminolevulinic salts as diagnostic agents and remedies for malignant tumors)

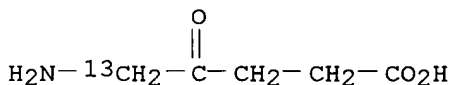
RN 60556-69-6 CAPLUS

CN Pentanoic acid, 5-(amino-15N)-4-oxo- (9CI) (CA INDEX NAME)



RN 79503-87-0 CAPLUS

CN Pentanoic-5-13C acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)



## REFERENCE COUNT:

7

## REFERENCE(S):

- (1) Anon; EP 845457 A1 CAPLUS
  - (2) Cosmo Research Institute, Cosmo Oil Co, Ltd; JP 04-9360 A 1992 CAPLUS
  - (3) Hua, Z; Cancer Res V55(8), P1723 CAPLUS
  - (4) Mitsubishi Chemical Corp; WO 97/03042 A1 1997 CAPLUS
  - (5) Nippon Oil Co, Ltd; JP 05-38294 A 1993 CAPLUS
- ALL CITATIONS AVAILABLE IN THE RE FORMAT

L16 ANSWER 3 OF 45 CAPLUS COPYRIGHT 2001 ACS

ACCESSION NUMBER: 1997:659247 CAPLUS

DOCUMENT NUMBER: 127:293588

TITLE: Synthesis of .delta.-[15N]aminolevulinic acid hydrochloride

AUTHOR(S): Iida, Katsumi; Takao, Yuki; Ogai, Tomoe; Kajiwara, Masahiro

CORPORATE SOURCE: Department of Medicinal Chemistry, Meiji College of Pharmacy, Tanashi, 188, Japan

SOURCE: J. Labelled Compd. Radiopharm. (1997), 39(10), 797-802  
 CODEN: JLCRD4; ISSN: 0362-4803

PUBLISHER: Wiley

DOCUMENT TYPE: Journal

LANGUAGE: English

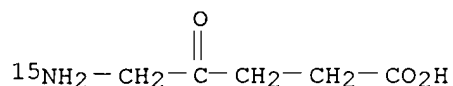
AB .delta.-[15N]aminolevulinic acid hydrochloride was synthesized in high yield by condensation of potassium [15N]phthalimide and tetrahydrofurfuryl bromide, followed by ruthenium oxidn. and hydrolysis. Relevant 15N-NMR spectral data are presented.

IT 116571-80-3

RL: RCT (Reactant)

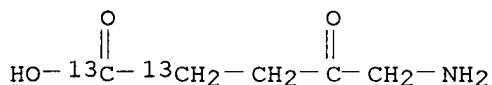
(synthesis of nitrogen-labeled aminolevulinic acid hydrochloride)  
 Searched by Barb O'Bryen, STIC 308-4291

RN 116571-80-3 CAPLUS  
 CN Pentanoic acid, 5-(amino-15N)-4-oxo-, hydrochloride (9CI) (CA INDEX NAME)



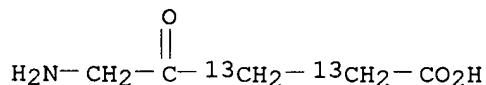
⊙ HCl

L16 ANSWER 4 OF 45 CAPLUS COPYRIGHT 2001 ACS  
 ACCESSION NUMBER: 1997:507923 CAPLUS  
 DOCUMENT NUMBER: 127:191034  
 TITLE: Synthesis of [1,2-13C]- and [2,3-13C]-labeled .delta.-aminolevulinic acid  
 AUTHOR(S): Bunce, Richard A.; Schilling, Curtis L., III; Rivera, Mario  
 CORPORATE SOURCE: Department of Chemistry, Oklahoma State University, Stillwater, OK, 74078-3071, USA  
 SOURCE: J. Labelled Compd. Radiopharm. (1997), 39(8), 669-675  
 CODEN: JLCRD4; ISSN: 0362-4803  
 PUBLISHER: Wiley  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English  
 AB [1,2-13C]- and [2,3-13C]-labeled .delta.-aminolevulinic acids (H<sub>2</sub>NCH<sub>2</sub>COCH<sub>2</sub>CH<sub>2</sub>CO<sub>2</sub>H; .delta.-ALA) have been prepd. by a four-step sequence. [1,2-13C]-Et bromoacetate was used to introduce the labels in the 1,2-labeled .delta.-ALA while [2-13C]-Et bromoacetate and [5-13C]-Meldrum's acid were used to introduce the labels in the 2,3-labeled deriv. These amino acid building blocks can be used to prep. heme-contg. proteins with labeled hemes according to previously reported biosynthetic method.  
 IT **194469-35-7P 194469-36-8P**  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (synthesis of doubly 13C-labeled .delta.-aminolevulinic acids)  
 RN 194469-35-7 CAPLUS  
 CN Pentanoic-1,2-13C<sub>2</sub> acid, 5-amino-4-oxo-, hydrochloride (9CI) (CA INDEX NAME)



○ HCl

RN 194469-36-8 CAPLUS  
 CN Pentanoic-2,3-13C<sub>2</sub> acid, 5-amino-4-oxo-, hydrochloride (9CI) (CA INDEX NAME)




● HCl

L16 ANSWER 5 OF 45 CAPLUS COPYRIGHT 2001 ACS

ACCESSION NUMBER: 1997:269694 CAPLUS

DOCUMENT NUMBER: 126:293223

TITLE:  An efficient synthesis of .delta.-aminolevulinic acid  
(ALA) and its isotopomers. [Erratum to document cited  
in CA126:171421]

AUTHOR(S): Wang, Jianji; Scott, A. Ian

CORPORATE SOURCE: Dep. Chemistry, Texas A&M Univ., College Station, TX,  
77843-3255, USA

SOURCE: Tetrahedron Lett. (1997), 38(15), 2587

CODEN: TELEAY; ISSN: 0040-4039

PUBLISHER: Elsevier

DOCUMENT TYPE: Journal

LANGUAGE: English

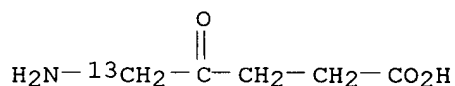
AB The authors regret that an important ref. to an earlier and similar  
approach to 5-aminolevulinic acid was inadvertently omitted from this  
paper.

IT 52065-79-9P 116571-80-3P 129720-94-1P

RL: SPN (Synthetic preparation); PREP (Preparation)

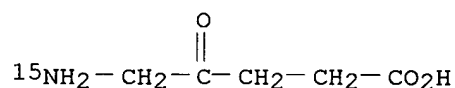
(efficient prepn. of .delta.-aminolevulinic acid and its isotopomers  
from labeled glycine (Erratum))

RN 52065-79-9 CAPLUS

CN Pentanoic-5-<sup>13</sup>C acid, 5-amino-4-oxo-, hydrochloride (9CI) (CA INDEX NAME)

● HCl

RN 116571-80-3 CAPLUS

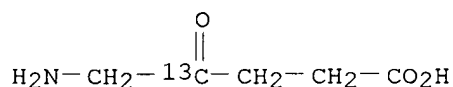
CN Pentanoic acid, 5-(amino-<sup>15</sup>N)-4-oxo-, hydrochloride (9CI) (CA INDEX NAME)

● HCl

RN 129720-94-1 CAPLUS

CN Pentanoic-4-<sup>13</sup>C acid, 5-amino-4-oxo-, hydrochloride (9CI) (CA INDEX NAME)

Searched by Barb O'Bryen, STIC 308-4291



O HCl

L16 ANSWER 6 OF 45 CAPLUS COPYRIGHT 2001 ACS

ACCESSION NUMBER: 1997:108749 CAPLUS  
 DOCUMENT NUMBER: 126:225514  
 TITLE: Enzymic synthesis of S-adenosyl-L-methionine on the preparative scale  
 AUTHOR(S): Park, Jeongho; Tai, Junzhe; Roessner, Charles A.; Scott, A. Ian  
 CORPORATE SOURCE: Center for Biological NMR, Department of Chemistry, Texas AandM University, College Station, TX, 77843-3255, USA  
 SOURCE: Bioorg. Med. Chem. (1996), 4(12), 2179-2185  
 CODEN: BMECEP; ISSN: 0968-0896  
 PUBLISHER: Elsevier  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English

AB The problems inherent in the enzymic and chem. synthesis of S-adenosyl-L-methionine (SAM) led to development of an efficient, simple method for the synthesis of large amts. of labeled SAM. It has previously been reported that the problem of product inhibition of E. coli SAM synthetase encoded by the metK gene was successfully overcome in the presence of sodium p-toluenesulfonate (pTsONa). This research has now been expanded to demonstrate that product inhibition of this enzyme can also be overcome by adding a high concn. of .beta.-mercaptoethanol (.beta.ME), acetonitrile, or urea. In addn., a recombinant strain of E. coli has been constructed that expresses the yeast SAM synthetase encoded by the sam2 gene. The yeast enzyme does not have the problem of product inhibition seen with the E. coli enzyme. Complete conversion of 10 mM methionine to SAM was achieved in incubations with either the recombinant yeast enzyme and 1 M potassium ion or the E. coli enzyme in the presence of additives such as .beta.ME, acetonitrile, urea, or pTsONa. The recombinant yeast SAM synthetase was used to generate SAM in situ for use in the multi-enzymic synthesis of precorrin 2.

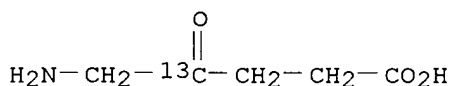
IT 114791-06-9

RL: RCT (Reactant)

(enzymic synthesis of S-adenosyl-L-methionine on the preparative scale)

RN 114791-06-9 CAPLUS

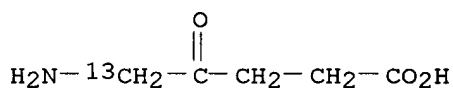
CN Pentanoic-4-13C acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)



L16 ANSWER 7 OF 45 CAPLUS COPYRIGHT 2001 ACS

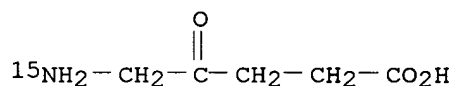
ACCESSION NUMBER: 1997:105596 CAPLUS  
 DOCUMENT NUMBER: 126:171421  
 TITLE: An efficient synthesis of .delta.-aminolevulinic acid (ALA) and its isotopomers  
 AUTHOR(S): Wang, Jianji; Scott, A. Ian  
 CORPORATE SOURCE: Dep. Chemistry, Texas A&M Univ., College Station, TX, Searched by Barb O'Bryen, STIC 308-4291

SOURCE: 77843-3255, USA  
Tetrahedron Lett. (1997), 38(5), 739-740  
CODEN: TELEAY; ISSN: 0040-4039  
PUBLISHER: Elsevier  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
AB A new and improved synthesis of 13C-4-, 13C-5- and 15N-.delta.-aminolevulinic acid (ALA), with 90% overall yield in 4 steps from labeled glycine, is described.  
IT 52065-79-9P 116571-80-3P 129720-94-1P  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(efficient prepn. of .delta.-aminolevulinic acid and its isotopomers from labeled glycine)  
RN 52065-79-9 CAPLUS  
CN Pentanoic-5-13C acid, 5-amino-4-oxo-, hydrochloride (9CI) (CA INDEX NAME)



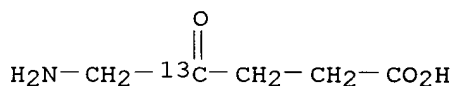
● HCl

RN 116571-80-3 CAPLUS  
CN Pentanoic acid, 5-(amino-15N)-4-oxo-, hydrochloride (9CI) (CA INDEX NAME)



● HCl

RN 129720-94-1 CAPLUS  
CN Pentanoic-4-13C acid, 5-amino-4-oxo-, hydrochloride (9CI) (CA INDEX NAME)



● HCl

L16 ANSWER 8 OF 45 CAPLUS COPYRIGHT 2001 ACS  
ACCESSION NUMBER: 1995:827143 CAPLUS  
DOCUMENT NUMBER: 123:222020  
TITLE: Biosynthetic preparation of isotopically labeled heme  
AUTHOR(S): Rivera, Mario; Walker, F. Ann  
CORPORATE SOURCE: Dep. Chem., Oklahoma State Univ., Stillwater, OK,  
74074, USA  
SOURCE: Anal. Biochem. (1995), 230(2), 295-302  
CODEN: ANBCA2; ISSN: 0003-2697  
Searched by Barb O'Bryen, STIC 308-4291

DOCUMENT TYPE: Journal  
LANGUAGE: English

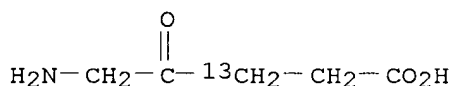
AB An efficient method for the prepn. of isotopically enriched heme was developed. This method utilizes a com. available bacterial host and plasmid, into which a synthetic gene encoding for rat liver outer mitochondrial membrane cytochrome b5, a heme-binding protein, was inserted. The method uses the efficient synthesis of the cytochrome b5 polypeptide together with the enhanced biosynthesis of heme brought about by addn. of the first committed precursor in heme biosynthesis, .delta.-aminolevulinic acid. Apocytochrome b5 sequesters heme as the macrocycle is being synthesized to form holocytochrome b5, thus avoiding toxic concns. of free macrocycle in the cell. Relatively high concns. of free heme in the cell have been shown to stimulate excretion of heme precursors such as coproporphyrinogen and uroporphyrinogen (W. F. Harris III et al., 1993), therefore causing isotopic diln. of the labeled material. The heme obtained by this methodol. was >85% enriched. Because the heme in cytochrome b5 is not covalently attached to the polypeptide, it can be extd. and used in other applications. Use of glutamate, a precursor of .delta.-aminolevulinate biosynthesis in Escherichia coli, did not result in high levels of isotopic incorporation into heme, thus pointing out the importance of using a labeled precursor that is committed to heme biosynthesis to obtain high levels of isotopic labeling.

IT 123253-93-0

RL: BPR (Biological process); BIOL (Biological study); PROC (Process)  
(biosynthetic prepn. of isotopically labeled heme)

RN 123253-93-0 CAPLUS

CN Pentanoic-3-13C acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)



L16 ANSWER 9 OF 45 CAPLUS COPYRIGHT 2001 ACS

ACCESSION NUMBER: 1994:190778 CAPLUS

DOCUMENT NUMBER: 120:190778

TITLE: Mechanism of acid catalysis in the cyclization of  
5-aminolevulinic acid and acetylacetone to  
3-acetyl-4-(2-carboxyethyl)-2-methylpyrrole

AUTHOR(S): Butler, Anthony R.; George, Sharon D.

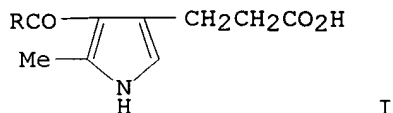
CORPORATE SOURCE: Sch. Chem., Univ. St. Andrews, St. Andrews, KY16 9ST,  
UK

SOURCE: J. Chem. Soc., Perkin Trans. 2 (1994), (2), 315-18  
CODEN: JCPKBH; ISSN: 0300-9580

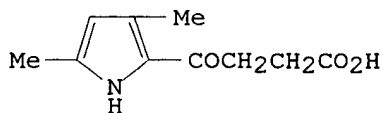
DOCUMENT TYPE: Journal

LANGUAGE: English

GI



I



II

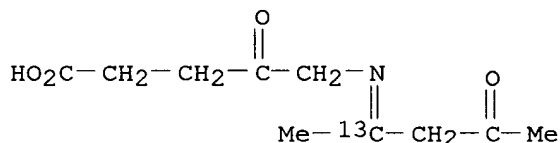
AB Under acid conditions 5-aminolevulinic acid reacts with acetylacetone to give the title heterocycle (I, R = Me). There is also formation of a small amt. of the Fischer-Fink product (II). <sup>13</sup>C and <sup>15</sup>N NMR spectroscopy showed that the first condensation product to accumulate is an enamino ketone (III). The trifluoro analog of III was isolated, and its cyclization to I (R = CF<sub>3</sub>) was monitored. There is a substantial spontaneous reaction, and the acid-catalyzed process occurs by specific acid catalysis.

IT 153695-89-7P

RL: PRP (Properties); FORM (Formation, nonpreparative); PREP (Preparation) (formation and NMR of)

RN 153695-89-7 CAPLUS

CN Pentanoic acid, 5-[(1-methyl-3-oxobutylidene-1-<sup>13</sup>C)amino]-4-oxo- (9CI) (CA INDEX NAME)



L16 ANSWER 10 OF 45 CAPLUS COPYRIGHT 2001 ACS

ACCESSION NUMBER: 1994:185710 CAPLUS

DOCUMENT NUMBER: 120:185710

TITLE: Biosynthesis of porphyrins and related macrocycles. Part 41. Fate of oxygen atoms as precorrin-2 carrying eight labeled carboxyl groups (<sup>13</sup>C<sup>18</sup>O<sub>2</sub>H) is enzymically converted to cobyrinic acid

AUTHOR(S): Vishwakarma, Ram A.; Balachandran, Sarala; Alanine, Alex I. D.; Stamford, N. Patrick J.; Kiuchi, Fumiyuki; Leeper, Finian J.; Battersby, Alan R.

CORPORATE SOURCE: Univ. Chem. Lab., Cambridge, CB2 1EW, UK

SOURCE: J. Chem. Soc., Perkin Trans. 1 (1993), (23), 2893-9  
CODEN: JCPRB4; ISSN: 0300-922X

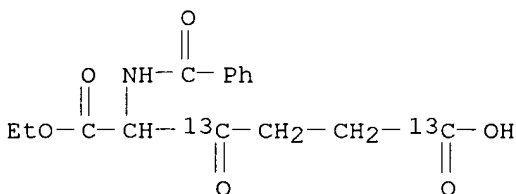
DOCUMENT TYPE: Journal

LANGUAGE: English

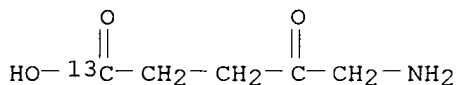
AB 5-Amino[1,4-<sup>13</sup>C<sub>2</sub>]levulinic acid and 5-amino[1-<sup>13</sup>C]levulinic acid are synthesized and all three <sup>16</sup>O atoms of the latter are exchanged for <sup>18</sup>O. The <sup>13</sup>C,<sup>18</sup>O-labeled material is then converted in vitro into precorrin-2 by the combined action of four genetically overproduced enzymes. The product is isolated in its aromatized form, sirohydrochlorin (I) and <sup>13</sup>C-NMR shows that all 8 carboxyl groups of I retain both oxygen atoms throughout the biosynthesis. A cell-free enzyme prepn. from *Propionibacterium shermanii* converts the <sup>13</sup>C,<sup>18</sup>O-labeled I via precorrin-2 into cobyrinic acid, a late precursor of vitamin B<sub>12</sub>. <sup>13</sup>C-NMR proves that 6 carboxyl groups of cobyrinic acid retain both oxygen atoms whereas the

Searched by Barb O'Bryen, STIC 308-4291

```
IT      153598-25-5P
        RL: SPN (Synthetic preparation); PREP (Preparation)
           (prepn. and conversion to aminolevulinate)
RN      153598-25-5  CAPLUS
CN      Hexanedioic-1,4-13C2 acid, 5-(benzoylamino)-4-oxo-, 6-ethyl ester (9CI)
        (CA INDEX NAME)
```



IT	<b>106213-17-6P</b>
	RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation)
	(prepn. and oxygen-18 exchange reaction of)
RN	106213-17-6 CAPLUS
CN	Pentanoic-1-13C acid, 5-amino-4-oxo-, hydrochloride (9CI) (CA INDEX NAME)

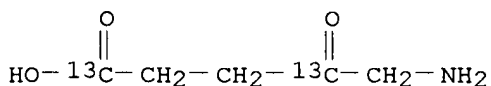


© HCL

```

IT      153598-23-3P
        RL: SPN (Synthetic preparation); PREP (Preparation)
            (prepn. of)
RN      153598-23-3  CAPLUS
CN      Pentanoic-1,4-13C2 acid, 5-amino-4-oxo-, hydrochloride (9CI)  (CA INDEX
        NAME)

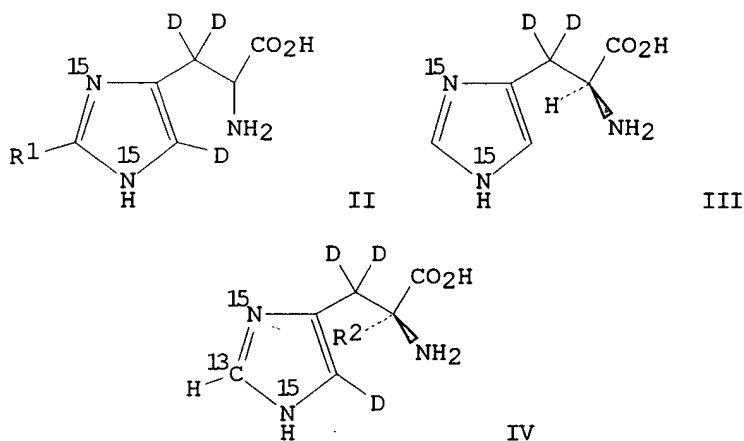
```



○ HCl

L16 ANSWER 11 OF 45 CAPLUS COPYRIGHT 2001 ACS  
ACCESSION NUMBER: 1992:612904 CAPLUS  
DOCUMENT NUMBER: 117:212904  
TITLE: Synthesis of selectively multi-labeled histidines with  
stable isotopes and chiral synthesis of L-histidine  
from L-aspartic acid  
AUTHOR(S): Furuta, Takashi; Katayama, Motofusa; Shibasaki,  
Hiromi; Kasuya, Yasuji  
CORPORATE SOURCE: Clin. Pharm., Tokyo Coll. Pharm., Hachioji, 192-03,  
Japan  
Searched by Barb O'Bryen, STIC 308-4291

SOURCE: J. Chem. Soc., Perkin Trans. 1 (1992), (13), 1643-8  
 CODEN: JCPRB4; ISSN: 0300-922X  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English  
 GI



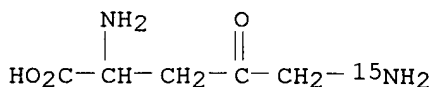
AB An efficient and concise synthesis of three types of multiple-labeled histidines with stable isotopes to be used for investigating pharmacokinetics and enzymic reaction mechanisms in vivo is described. Selective deuteration at C-3 and C-5 of diamino acid DL-H215NCR2COCR2CH(NH2)CO2H (I; R = H) was achieved by hydrogen exchange to give tetradeuterated acid I (R = D). The imidazole ring was constructed by heating of I (R = D) with NaSC15N in D2O to give labeled 2'-mercapto-DL-histidine DL-II (R1 = SH), which was oxidized at C-2' to give the desired histidine L-II (R1 = H) after enzymic resoln. To replace deuterium at C-5' with hydrogen, the labeled histidine DL-II (R1 = H) was heated in water (pH 5.0) at 180.degree., and subsequent enzymic resoln. gave III. A similar sequence of reactions carried out on the diamino acid I (R = D) with KS13C15N gave DL-IV (R2 = H). Deuteration at C-2 and C-2' of DL-IV (R2 = H) with DCl-D2O (pD 5.0) at 180.degree. and subsequent back-exchange of deuterium at C-2' with water (pH 7.0) at 120.degree. gave DL-IV (R2 = D). Synthesis of optically pure L-histidine starting from L-aspartic acid is also described. The optical purity of the synthesized L-histidine was estd. to be 93.8% enantiomeric excess.

IT 143687-01-8P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation)  
 (prepn. and deuteration of, tetradeuterio analog from)

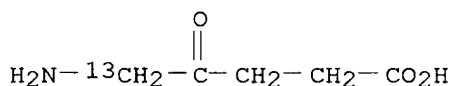
RN 143687-01-8 CAPLUS

CN Ornithine-N5-15N, 4-oxo-, dihydrochloride (9CI) (CA INDEX NAME)

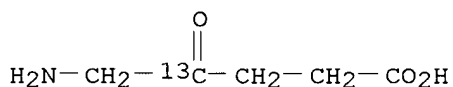


●2 HCl

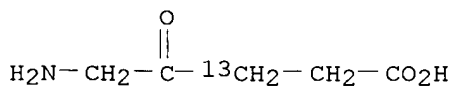
L16 ANSWER 12 OF 45 CAPLUS COPYRIGHT 2001 ACS  
 ACCESSION NUMBER: 1992:37407 CAPLUS  
 DOCUMENT NUMBER: 116:37407  
 TITLE: Enzymic synthesis and structure of precorrin-3, a trimethyldipyrrocorphin intermediate in vitamin B12 biosynthesis  
 AUTHOR(S): Warren, Martin J.; Roessner, Charles A.; Ozaki, Shinichi; Stolowich, Neal J.; Santander, Patricio J.; Scott, A. Ian  
 CORPORATE SOURCE: Cent. Biol. NMR, Texas A and M Univ., College Station, TX, 77843-3255, USA  
 SOURCE: Biochemistry (1992), 31(2), 603-9  
 CODEN: BICHAW; ISSN: 0006-2960  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English  
 AB The trimethylated intermediate of vitamin B12 (corrin) biosynthesis, precorrin-3, was produced from various <sup>13</sup>C-enriched isotopomers of 5-aminolevulinic acid by using a multiple-enzyme system contg. aminolevulinic acid dehydratase, porphobilinogen deaminase uroporphyrinogen (uro'gen) III synthetase, and the S-adenosyl-L-methionine (SAM-) dependent uro'gen III methyltransferase and precorrin-2 methyltransferase in the presence of [<sup>13</sup>C]SAM. Structural anal. of the resulting product, precorrin-3, reveals a close similarity to precorrin-2 but with several subtle differences in the conjugated array of C:C and C:N bonds that reflect the presence of the new C-Me group at C20 and its influence on the electronic distribution in the dipyrrocorphin chromophore. The implications of this structure for corrin biosynthesis are discussed.  
 IT 79503-87-0 114791-06-9 123253-93-0  
 RL: ANST (Analytical study)  
 (in precorrin enzymic prepn.)  
 RN 79503-87-0 CAPLUS  
 CN Pentanoic-5-<sup>13</sup>C acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)



RN 114791-06-9 CAPLUS  
 CN Pentanoic-4-<sup>13</sup>C acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)

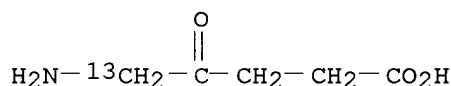


RN 123253-93-0 CAPLUS  
 CN Pentanoic-3-<sup>13</sup>C acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)



L16 ANSWER 13 OF 45 CAPLUS COPYRIGHT 2001 ACS  
 ACCESSION NUMBER: 1991:19952 CAPLUS  
 Searched by Barb O'Bryen, STIC 308-4291

DOCUMENT NUMBER: 114:19952  
 TITLE: Biosynthesis of porphyrins and related macrocycles. Part 35. Discovery of a novel dipyrrolic cofactor essential for the catalytic action of hydroxymethylbilane synthase (porphobilinogen deaminase)  
 AUTHOR(S): Hart, Graham J.; Miller, Andrew D.; Beifuss, Uwe; Leeper, Finian J.; Battersby, Alan R.  
 CORPORATE SOURCE: Univ. Chem. Lab., Cambridge, CB2 1EW, UK  
 SOURCE: J. Chem. Soc., Perkin Trans. 1 (1990), (7), 1979-93  
 CODEN: JCPRB4; ISSN: 0300-922X  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English  
 AB Hydroxymethylbilane synthase constructs the open-chain hydroxymethylbilane by assembly of 4 porphobilinogen units head-to-tail, the first of these being covalently bound to the enzyme through a group X. The surprising discovery is made that X is a novel dipyrromethane cofactor constructed from 2 porphobilinogen units and bound to the protein via the S of cysteine. This cofactor does not turn over in the catalytic process but acts as an anchor for the assembly of hexapyrrole from which the tetrapyrrolic hydroxymethylbilane is cleaved leaving the dipyrromethane cofactor in place for a further building cycle.  
 IT **52065-79-9P**  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (prepn. and porphobilinogen deaminase dipyrromethane cofactor formation from)  
 RN 52065-79-9 CAPLUS  
 CN Pentanoic-5-13C acid, 5-amino-4-oxo-, hydrochloride (9CI) (CA INDEX NAME)



● HCl

L16 ANSWER 14 OF 45 CAPLUS COPYRIGHT 2001 ACS  
 ACCESSION NUMBER: 1990:628049 CAPLUS  
 DOCUMENT NUMBER: 113:228049  
 TITLE: Radiolabeling of chlorophyll for studies on catabolism  
 AUTHOR(S): Peisker, Christian; Thomas, Howard; Keller, Felix; Matile, Philippe  
 CORPORATE SOURCE: Dep. Plant Biol., Univ. Zurich, Zurich, CH-8008, Switz.  
 SOURCE: J. Plant Physiol. (1990), 136(5), 544-9  
 CODEN: JPPHEY; ISSN: 0176-1617  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English  
 AB A technique for specifically radiolabelling chlorophyll (Chl) during greening of etiolated barley seedlings is described. Both detached shoots and intact seedlings were employed. Shoots were pretreated with gabaculine, an inhibitor of the reversible .delta.-aminolevulinic acid (ALA)-synthesizing transaminase, and then exposed to low light levels in the presence of 4[14C]-ALA. Radioactivity in ALA labeled in the 4-position is locked into the pyrrole rings of porphyrin. Under these circumstances, 80-90% of the total label incorporated during greening was sol. in 80% acetone and of the acetone-sol. radioactivity over 70% was extractable with hexane and recovered in Chl a and b. The feeding of ALA  
 Searched by Barb O'Bryen, STIC 308-4291

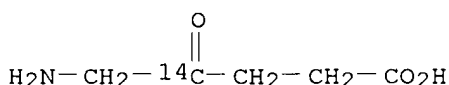
via the rootlets of whole seedlings yielded the same pattern of labeling. It did not require the presence of gabaculine and was assocd. with a better reproducibility of uptake and total incorporation of radioactivity than expts. with detached shoots. Upon the induction of senescence, radioactivity gradually disappeared from the Chls and appeared in a no. of polar compds. Two of them turned out to be identical with putative nongreen catabolites described earlier.

IT 7729-71-7

RL: BIOL (Biological study)

(radiolabeling of chlorophyll with, during greening of etiolated barley seedlings, for studies on catabolism)

RN 7729-71-7 CAPLUS

CN Pentanoic-4-<sup>14</sup>C acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)

L16 ANSWER 15 OF 45 CAPLUS COPYRIGHT 2001 ACS

ACCESSION NUMBER: 1990:553043 CAPLUS

DOCUMENT NUMBER: 113:153043

TITLE: Preparation of <sup>13</sup>C-labeled 5-aminolevulinic acid

INVENTOR(S): Kajiwara, Masahiro

PATENT ASSIGNEE(S): Nippon Steel Chemical Co., Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 9 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

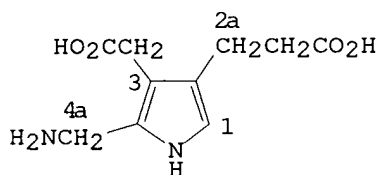
LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 02111747	A2	19900424	JP 1988-263877	19881021

GI



V

AB 1-, 3-, 4- Or 5-<sup>13</sup>C-labeled 5-aminolevulinic acid (I), useful in diagnosis or study of biosynthesis and metab. by <sup>13</sup>C-NMR, is prepd. from [1- and/or 2-<sup>13</sup>C] ACoNa (II) via intermediates BrCH<sub>2</sub>CO<sub>2</sub>Et (III), (2,2-dimethyl-1,3-dioxane-4,6-dione), and N-phthaloylglycine (IV) and is further condensed in the presence of a dehydratase to give <sup>13</sup>C-labeled porphobilinogen (V). Thus, a soln. of IV Et ester in MeOCH<sub>2</sub>CH<sub>2</sub>OMe (DME) was added to a suspension of NaH in DME and after stirring 1 h a DME soln. of [1-<sup>13</sup>C]III added, the mixt. was stirred 1 day to give [1-<sup>13</sup>C]Et 3-ethoxycarbonyl-N-phthaloyllevalinate which was hydrolyzed with ACOH/concd. HCl (1:1) under reflux to give [1-<sup>13</sup>C]I. HCl. [3-<sup>13</sup>C]- and [5-<sup>13</sup>C] I prepd. from [2-<sup>13</sup>C]BrCH<sub>2</sub>CO<sub>2</sub>H and [2-<sup>13</sup>C]glycine, resp., were stirred with

Searched by Barb O'Bryen, STIC 308-4291

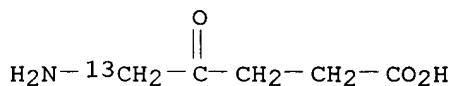
aminolevulinate dehydratase in a phosphate buffer contg.  
ZnSO<sub>4</sub>-dithiothreitol to give [2a,3-<sup>13</sup>C] and [2,4a-<sup>13</sup>C] I, resp.

IT 52065-79-9P 106213-17-6P 129720-94-1P  
129720-95-2P 129720-96-3P

RL: SPN (Synthetic preparation); PREP (Preparation)  
(prepn. of, as intermediate for <sup>13</sup>C-labeled porphobilinogen)

RN 52065-79-9 CAPLUS

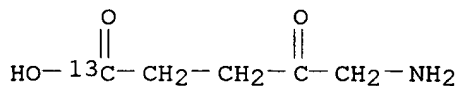
CN Pentanoic-5-<sup>13</sup>C acid, 5-amino-4-oxo-, hydrochloride (9CI) (CA INDEX NAME)



● HCl

RN 106213-17-6 CAPLUS

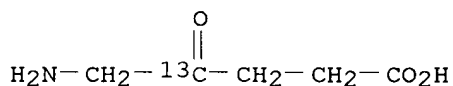
CN Pentanoic-1-<sup>13</sup>C acid, 5-amino-4-oxo-, hydrochloride (9CI) (CA INDEX NAME)



● HCl

RN 129720-94-1 CAPLUS

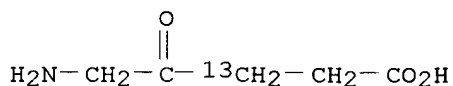
CN Pentanoic-4-<sup>13</sup>C acid, 5-amino-4-oxo-, hydrochloride (9CI) (CA INDEX NAME)



● HCl

RN 129720-95-2 CAPLUS

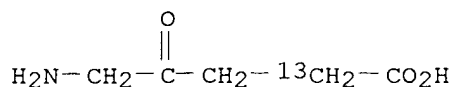
CN Pentanoic-3-<sup>13</sup>C acid, 5-amino-4-oxo-, hydrochloride (9CI) (CA INDEX NAME)



● HCl

RN 129720-96-3 CAPLUS

CN Pentanoic-2-<sup>13</sup>C acid, 5-amino-4-oxo-, hydrochloride (9CI) (CA INDEX NAME)



O HCl

L16 ANSWER 16 OF 45 CAPLUS COPYRIGHT 2001 ACS

ACCESSION NUMBER: 1990:528599 CAPLUS

DOCUMENT NUMBER: 113:128599

TITLE: Nitrogen-15 and carbon-13 NMR studies of ligands bound to the 280 000-dalton protein porphobilinogen synthase elucidate the structures of enzyme-bound product and a Schiff base intermediate

AUTHOR(S): Jaffe, Eileen K.; Markham, George D.; Rajagopalan, Jayanthi S.

CORPORATE SOURCE: Sch. Dent. Med., Univ. Pennsylvania, Philadelphia, PA, 19104-6002, USA

SOURCE: Biochemistry (1990), 29(36), 8345-50  
CODEN: BICHAW; ISSN: 0006-2960

DOCUMENT TYPE: Journal

LANGUAGE: English

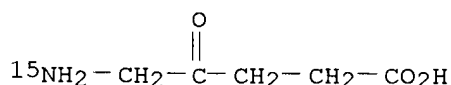
AB Porphobilinogen synthase (PBGS) catalyzes the asym. condensation of 2 mols. of 5-aminolevulinic acid (ALA). Despite the 280,000-dalton size of PBGS, much can be learned about the reaction mechanism through  $^{13}\text{C}$  and  $^{15}\text{N}$  NMR. These studies may represent the largest protein complex for which individual nuclei have been characterized by  $^{13}\text{C}$  or  $^{15}\text{N}$  NMR. Here,  $^{13}\text{C}$  NMR studies are extended to PBGS complexes with [3,3- $^2\text{H}_2$ ,3- $^{13}\text{C}$ ]ALA and  $^{15}\text{N}$  NMR studies of [15N]ALA bound to PBGS are reported. As in previous  $^{13}\text{C}$  NMR studies, observation of enzyme-bound  $^{15}\text{N}$ -labeled species was facilitated by deuteration at N atoms that are attached to slowly exchanging H atoms. For holo-PBGS at neutral pH, the NMR spectra reflected the structure of the enzyme-bound product porphobilinogen (PBG), whose chem. shifts were uniformly consistent with deprotonation of the  $\text{NH}_2$  group whose soln. pKa is 11. Despite this local environment, the protons of the  $\text{NH}_2$  group were in rapid exchange with solvent ( $k_{\text{exchange}} > 10^2 \text{ s}^{-1}$ ). For Me methanethiosulfonate (MTS)-modified PBGS, the NMR spectra reflected the chem. of an enzyme-bound Schiff base intermediate that was formed between C4 of ALA and an active-site lysine. The  $^{13}\text{C}$  chem. shift of [3,3- $^2\text{H}_2$ ,3- $^{13}\text{C}$ ]ALA confirmed that the Schiff base is an imine of E stereochem. By comparison to model imines formed between [15N]ALA and hydrazine or hydroxylamine, the  $^{15}\text{N}$  chem. shift of the enzyme-bound Schiff base suggested that the free  $\text{NH}_2$  group is in an environment resembling partial deprotonation; again the protons were in rapid exchange with solvent. Deprotonation of the  $\text{NH}_2$  group would facilitate formation of a Schiff base between the  $\text{NH}_2$  group of the enzyme-bound Schiff base and C4 of the 2nd ALA substrate. This is the 1st evidence supporting C-N bond formation as the initial site of interaction between the 2 substrate mols.

IT 60556-69-6 114791-06-9 123253-93-0

RL: RCT (Reactant)

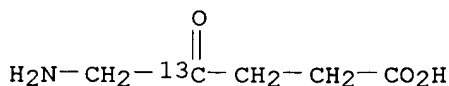
(reaction of, with porphobilinogen synthase of liver, NMR study of)

RN 60556-69-6 CAPLUS

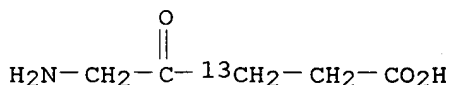
CN Pentanoic acid, 5-(amino- $^{15}\text{N}$ )-4-oxo- (9CI) (CA INDEX NAME)

Searched by Barb O'Bryen, STIC 308-4291

RN 114791-06-9 CAPLUS  
CN Pentanoic-4-13C acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)



RN 123253-93-0 CAPLUS  
CN Pentanoic-3-13C acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)

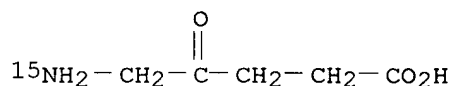


L16 ANSWER 17 OF 45 CAPLUS COPYRIGHT 2001 ACS  
ACCESSION NUMBER: 1990:494527 CAPLUS  
DOCUMENT NUMBER: 113:94527  
TITLE: Studies on the biosynthesis of corrinoids and porphyrinoids. II. The origin of nitrogen of vitamin B12  
AUTHOR(S): Kurumaya, Katsuyuki; Okazaki, Takeo; Kajiwara, Masahiro  
CORPORATE SOURCE: Dep. Med. Chem., Meiji Coll. Pharm., Tanashi, 188, Japan  
SOURCE: Chem. Pharm. Bull. (1990), 38(4), 1058-61  
CODEN: CPBTAL; ISSN: 0009-2363  
DOCUMENT TYPE: Journal  
LANGUAGE: English

AB To clarify the origin of N of vitamin B12, 15N-labeled aminolevulinic acid (ALA) was prepd. and administered to Propionibacterium shermanii. Vitamin B12 thus isolated showed 4 signals in the 15N-NMR spectrum. The N of [5-15N]riboflavin was incorporated into the benzimidazole part of vitamin B12. Hydroxycobalamin was transformed into cyanocobalamin by treatment with KCl15N, and the 15N-NMR spectrum was measured. The results of these expts. revealed the origin of the N of vitamin B12 and allowed the 15N-NMR signals to be assigned.

IT 116571-80-3P  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(prepn. of)

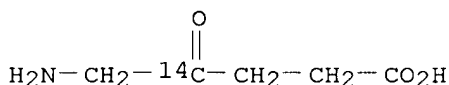
RN 116571-80-3 CAPLUS  
CN Pentanoic acid, 5-(amino-15N)-4-oxo-, hydrochloride (9CI) (CA INDEX NAME)



● HCl

L16 ANSWER 18 OF 45 CAPLUS COPYRIGHT 2001 ACS  
ACCESSION NUMBER: 1990:406765 CAPLUS  
DOCUMENT NUMBER: 113:6765  
Searched by Barb O'Bryen, STIC 308-4291

TITLE: A short synthesis of 5-amino[4-14C]levulinic acid hydrochloride  
 AUTHOR(S): Campbell, J. B.; Johnston, J. S.  
 CORPORATE SOURCE: Amersham Int. PLC, Cardiff, CF4 7YT, UK  
 SOURCE: J. Labelled Compd. Radiopharm. (1989), 27(12), 1353-8  
 CODEN: JLCRD4; ISSN: 0362-4803  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English  
 OTHER SOURCE(S): CASREACT 113:6765  
 AB The title compd. was prepd. from K14CN in 56% overall yield. The key step is the Pd(0)-catalyzed coupling of 2-phthalimido[1-14C]acetyl chloride with EtO2CCH2CH2ZnI to give 5-phthalimido[4-14C]levulinic acid Et ester in 86% yield. The synthesis was carried out at high specific activity from 720 mCi of starting material.  
 IT **16387-80-7P**, 5-Amino[4-14C]levulinic acid hydrochloride  
 RL: SPN (Synthetic preparation); PREP (Preparation) (prepn. of)  
 RN 16387-80-7 CAPLUS  
 CN Pentanoic-4-14C acid, 5-amino-4-oxo-, hydrochloride (9CI) (CA INDEX NAME)



○ HCl

L16 ANSWER 19 OF 45 CAPLUS COPYRIGHT 2001 ACS  
 ACCESSION NUMBER: 1990:134583 CAPLUS  
 DOCUMENT NUMBER: 112:134583  
 TITLE: Biosynthesis of chlorophyll and bacteriochlorophyll  
 AUTHOR(S): Okazaki, Takeo; Sagae, Yoko; Kurumaya, Katsuyuki; Kajiwar, Masahiro  
 CORPORATE SOURCE: Dep. Med. Chem., Meiji Coll. Pharm., Japan  
 SOURCE: Tennen Yuki Kagobutsu Toronkai Koen Yoshishu (1989), 31st, 677-84  
 CODEN: TYKYDS  
 DOCUMENT TYPE: Journal  
 LANGUAGE: Japanese  
 AB 13C-labeled precursors such as glycine, methionine, and glutamic acid were synthesized for the biosynthesis of porphyrinoid. The regioselective synthesis of 13-labeled ALA (.delta.-aminolevulinic acid) also carried out was in the same manner from 13C-labeled Na acetate. These were utilized in the study of the biosynthesis of chlorophyll and bacteriochlorophyll. L-[1-13C]glutamic acid-incorporated chlorophyll showed 13C-enriched peaks at sp3 region. This result shows that ring C atoms are derived from glutamic acid by the Beale route in Euglena gracilis. Incorporation of [2-13C]glycine by E. gracilis gave chlorophyll labeled at 10b Me ester (52.4 ppm). In the same way, L-[13CH3]methionine was incorporated and showed an enriched peak at 52.4 ppm. This indicates that glycine was metabolized into methionine and was incorporated into 1 side chain of chlorophyll in E. gracilis. [2-13C]glycine-incorporated bacteriochlorophyll showed 13C-enriched peaks at sp2 region. Also the feeding expt. with [5-13C]ALA into bacteriochlorophyll showed the same result, indicating that ALA is derived from glycine by the Shemin route in Rhodospseudomonas spheroides. Furthermore, a feeding expt. with 13C-labeled ALA in 50% D2O medium and of 13C, 2H-double-labeled ALA into bacteriochlorophyll showed .alpha., .beta. isotope-shifted peaks at ring  
 Searched by Barb O'Bryen, STIC 308-4291

carbons. Thus, ring protons at the C5a, C3, C4, C8 position of bacteriochlorophyll are derived from water in R. spheroides.

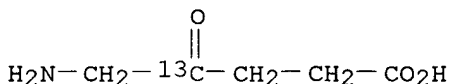
IT 114791-06-9P 123253-92-9P 123253-93-0P

RL: SPN (Synthetic preparation); PREP (Preparation)

(prepn. of and application to bacteriochlorophyll formation by Rhodospseudomonas spheroides)

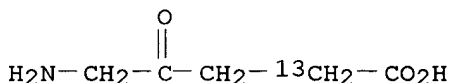
RN 114791-06-9 CAPLUS

CN Pentanoic-4-13C acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)



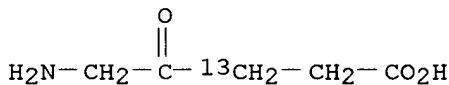
RN 123253-92-9 CAPLUS

CN Pentanoic-2-13C acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)



RN 123253-93-0 CAPLUS

CN Pentanoic-3-13C acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)



L16 ANSWER 20 OF 45 CAPLUS COPYRIGHT 2001 ACS

ACCESSION NUMBER: 1989:574621 CAPLUS

DOCUMENT NUMBER: 111:174621

TITLE: A facile synthesis of .delta.-aminolevulinic acid (ALA) regioselectively labeled with carbon-13 and direct observation of enzymatic transformation from ALA to porphobilinogen (PBG)

AUTHOR(S): Kurumaya, Katsuyuki; Okazaki, Takeo; Seido, Nobuo; Akasaka, Yuzuru; Kawajiri, Yoshiki; Kajiwara, Masahiro; Kondo, Masao

CORPORATE SOURCE: Meiji Coll. Pharm., Tanashi, 188, Japan

SOURCE: J. Labelled Compd. Radiopharm. (1989), 27(2), 217-35  
CODEN: JLCRD4; ISSN: 0362-4803

DOCUMENT TYPE: Journal

LANGUAGE: English

OTHER SOURCE(S): CASREACT 111:174621

AB .delta.-Aminolevulinic acid (I) labeled with carbon-13 at position 1, 2, 3, 4, or 5, was synthesized from 13C-labeled glycine, Meldrum's acid, or bromoacetate. The latter compds. were prepd. from 13C-sodium acetate or 13C-acetic acid. Enzymic transformation of I to porphobilinogen was directly obsd. by 13C NMR.

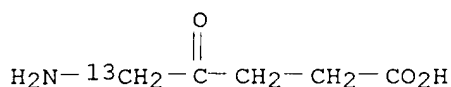
IT 79503-87-0P 123253-93-0P

RL: SPN (Synthetic preparation); PREP (Preparation)

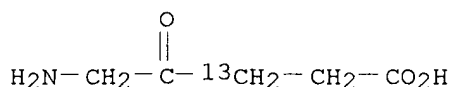
(prepn. and enzymic transformation of, to porphobilinogen)

RN 79503-87-0 CAPLUS

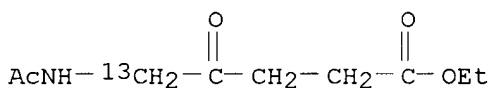
CN Pentanoic-5-13C acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)



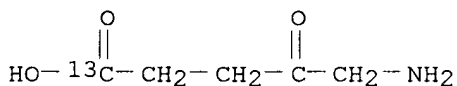
RN 123253-93-0 CAPLUS  
 CN Pentanoic-3-<sup>13</sup>C acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)



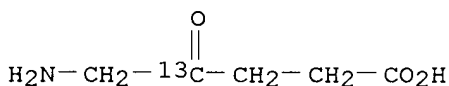
IT **113433-13-9P**  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation)  
 (prepn. and hydrolysis or deuteration of)  
 RN 113433-13-9 CAPLUS  
 CN Pentanoic-5-<sup>13</sup>C acid, 5-(acetylamino)-4-oxo-, ethyl ester (9CI) (CA INDEX NAME)



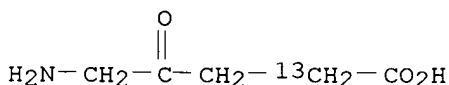
IT **98599-93-0P 114791-06-9P 123253-92-9P**  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (prepn. of)  
 RN 98599-93-0 CAPLUS  
 CN Pentanoic-1-<sup>13</sup>C acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)



RN 114791-06-9 CAPLUS  
 CN Pentanoic-4-<sup>13</sup>C acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)



RN 123253-92-9 CAPLUS  
 CN Pentanoic-2-<sup>13</sup>C acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)



L16 ANSWER 21 OF 45 CAPLUS COPYRIGHT 2001 ACS  
 ACCESSION NUMBER: 1989:53854 CAPLUS  
 DOCUMENT NUMBER: 110:53854  
 Searched by Barb O'Bryen, STIC 308-4291

TITLE: Carbon-14 labeling and biological activity of the tumor-localizing derivative of hematoporphyrin  
 AUTHOR(S): Ho, Yau Kwan; Pandey, Ravindra K.; Missert, Joseph R.; Bellnier, David A.; Dougherty, Thomas J.  
 CORPORATE SOURCE: Oncol. Found. Buffalo, Buffalo, NY, 14203, USA  
 SOURCE: Photochem. Photobiol. (1988), 48(4), 445-9  
 CODEN: PHCBAP; ISSN: 0031-8655  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English

AB 14C-labeled hematoporphyrin ([14C]HP) was synthesized by 2 methods. Using an in vitro avian whole-blood system, [14C]protoheme was obtained biosynthetically by incorporating [14C]aminolevulinic acid into the porphyrin ring structure. Subsequently, the [14C]protoheme was converted to [14C]HP by std. procedures. By adopting several well-characterized chem. reactions, deuteroporphyrin was treated with [14C]acetyl chloride, giving [14C]diacetyldeuteroporphyrin which was readily reduced and hydrolyzed to [14C]HP (with the 14C label on the hydroxyethyl side-chains). These 2 methods are simple and afford good yields of [14C]HP with moderate to high specific activities. The [14C]HP was then treated with AcOH/H2SO4 followed by NaOH to give [14C]HPD. Upon gel and ultrafiltration, the [14C]HPD was enriched in the so-called tumor-localizing fraction of HPD, giving [14C]Photofrin II (PII) with specific activities of 0.4 Ci/mol (biosynthesis) and 10 Ci/mol (chem. synthesis). These [14C]PII preps. were equiv. with respect to chromatog. and spectrophotometric characteristics, as well as tumoricidal photodynamic activity in the DBA/2 Ha-DD mouse: SMT-F tumor system, to the unlabeled com. product Photofrin II. The distribution of [14C]PII in mouse tissues was in close agreement to that previously reported, after adjustment for dose, for [14C]HPD biosynthetically labeled in vivo, as well as for Photofrin II, where tissue levels were detd. spectrophotometrically after extn.

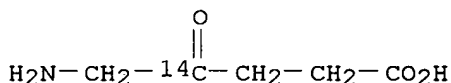
IT 7729-71-7

RL: PROC (Process)

(incorporation of, into porphyrin)

RN 7729-71-7 CAPLUS

CN Pentanoic-4-14C acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)



L16 ANSWER 22 OF 45 CAPLUS COPYRIGHT 2001 ACS

ACCESSION NUMBER: 1988:611234 CAPLUS

DOCUMENT NUMBER: 109:211234

TITLE: Labeling method with enriched carbon-13 stable isotopes

AUTHOR(S): Kajiwara, Masahiro

CORPORATE SOURCE: Meiji Coll. Pharm., Tokyo, 154, Japan

SOURCE: Saishin Igaku (1987), 42(6), 1328-31

CODEN: SAIGAK; ISSN: 0370-8241

DOCUMENT TYPE: Journal; General Review

LANGUAGE: Japanese

AB A review with 9 refs. on 13C-NMR as applied to the mol. structural study of natural products. Syntheses of [4-13C]-(2RS)-.alpha.-tocopherol and [4-13C]-(2RS)-.alpha.-tocopheryl acetate (I) were shown together with H noise-decoupled natural abundance 13C-FT NMR spectrum of DL-.alpha.-tocopheryl acetate and proton noise-decoupled 13C-FT NMR spectrum of 13C-enriched (I). Synthesis of [5-13C]-aminolevulinic acid (II) was shown with H noise-decoupled 13C-FT NMR spectrum of (II) and Searched by Barb O'Bryen, STIC 308-4291

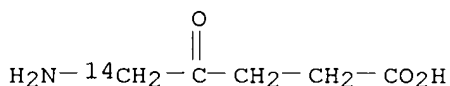
[5-13C]-II. Biosynthesis of erythromycin A was shown with H noise-decoupled 13C-FT NMR spectrum of [1-13C]-sodium propionate enriched erythromycin A.

IT 5976-91-0P

RL: PREP (Preparation)  
(synthesis and carbon-13 NMR of)

RN 5976-91-0 CAPLUS

CN Pentanoic-5-14C acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)



L16 ANSWER 23 OF 45 CAPLUS COPYRIGHT 2001 ACS

ACCESSION NUMBER: 1988:419382 CAPLUS

DOCUMENT NUMBER: 109:19382

TITLE: Carbon-13 NMR studies of methylene and methine carbons of substrate bound to a 280,000-dalton protein, porphobilinogen synthase

AUTHOR(S): Jaffe, Eileen K.; Markham, George D.

CORPORATE SOURCE: Sch. Dent. Med., Univ. Pennsylvania, Philadelphia, PA, 19104-6002, USA

SOURCE: Biochemistry (1988), 27(12), 4475-81  
CODEN: BICHAW; ISSN: 0006-2960

DOCUMENT TYPE: Journal

LANGUAGE: English

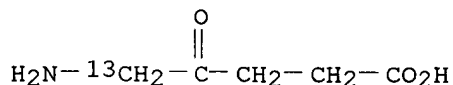
AB 13C NMR was used to observe the equil. complex of [5,5-2H,5-13C]-5-aminolevulinate ([5,5-2H,5-13C]ALA) bound to porphobilinogen (PBG) synthase (5-aminolevulinate dehydratase), a 280,000-dalton protein. [5,5-2H, 5-13C]ALA (chem. shift 46.9 ppm in D2O) was prepd. from [5-13C]ALA through enolization in deuteriated neutral potassium phosphate buffer. In the PBG synthase reaction [5,5-2H,5-13C]ALA forms [2,11,11-2H,2,11-13C]PBG (chem. shifts 116.2 ppm for C2 and 34.2 ppm for C11 in D2O). For the complex formed between [5,5-2H,5-13C]ALA and Me methanethiosulfonate (MTS)-modified PBG synthase, which does not catalyze PBG formation but can form a Schiff base adduct, the chem. shift of 44.2 ppm (line width 92 Hz) identified an imine structure as the predominant tautomeric form of the Schiff base. By comparison to model compds., the stereochem. of the imine was deduced; however, the protonation state of the imine atom remained unresolved. Reconstitution of the MTS-modified enzyme-Schiff base complex with Zn(II) and 2-mercaptoethanol resulted in the holoenzyme-bound equil. complex; this complex contained predominantly enzyme-bound PBG, and spectra revealed 2 peaks from bound PBG and 2 from free PBG. For bound PBG, C2 was -2.8 ppm from the free signal and C11 was +2.6 ppm from the free signal; the line widths of the bound signals were 55 and 75 Hz, resp. To aid in interpretation of these shifts, and those previously obsd. with [4-13C]ALA as substrate (which forms [3,5-13C]PBG), the 13C NMR chem. shifts of PBG were investigated as functions of pH and a variety of org. solvents. The obsd. shifts of bound PBG were not consistent with simple protonation/deprotonation of PBG nor with changes that could be duplicated by solvation by simple org. solvents.

IT 79503-87-0

RL: BIOL (Biological study)  
(deuteriation of)

RN 79503-87-0 CAPLUS

CN Pentanoic-5-13C acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)

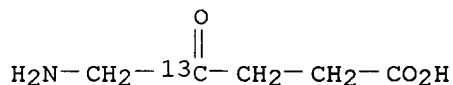


IT 114791-06-9

RL: RCT (Reactant)

(reaction of, with porphobilinogen synthase)

RN 114791-06-9 CAPLUS

CN Pentanoic-4-<sup>13</sup>C acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)

L16 ANSWER 24 OF 45 CAPLUS COPYRIGHT 2001 ACS

ACCESSION NUMBER: 1988:150138 CAPLUS

DOCUMENT NUMBER: 108:150138

TITLE: A new synthesis and NMR-spectroscopy of  
[<sup>15</sup>N-5,4-<sup>13</sup>C]-aminolevulinic acidAUTHOR(S): Nitsche, Bernhard; Koest, Hans Peter; Cmiel, Edmund;  
Schneider, SiegfriedCORPORATE SOURCE: Inst. Phys. Theor. Chem., Tech. Univ. Muenchen,  
Garching, D-8046, Fed. Rep. Ger.SOURCE: J. Labelled Compd. Radiopharm. (1987), 24(6), 623-30  
CODEN: JLCRD4; ISSN: 0362-4803

DOCUMENT TYPE: Journal

LANGUAGE: English

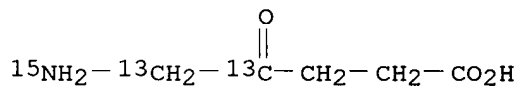
OTHER SOURCE(S): CASREACT 108:150138

AB H<sup>215</sup>N<sup>13</sup>CH<sub>2</sub><sup>13</sup>COCH<sub>2</sub>CH<sub>2</sub>CO<sub>2</sub>H was prepd. from <sup>13</sup>C.

IT 113639-01-3P

RL: SPN (Synthetic preparation); PREP (Preparation)  
(prepn. of)

RN 113639-01-3 CAPLUS

CN Pentanoic-4,5-<sup>13</sup>C<sub>2</sub> acid, 5-(amino-<sup>15</sup>N)-4-oxo-, hydrochloride (9CI) (CA  
INDEX NAME)

● HCl

L16 ANSWER 25 OF 45 CAPLUS COPYRIGHT 2001 ACS

ACCESSION NUMBER: 1988:131031 CAPLUS

DOCUMENT NUMBER: 108:131031

TITLE: Preparation of <sup>13</sup>C-labeled aminolevulinic acid as a  
pharmaceutical intermediate

INVENTOR(S): Kajiwara, Masahiro

PATENT ASSIGNEE(S): Japan Spectroscopic Co., Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 4 pp.

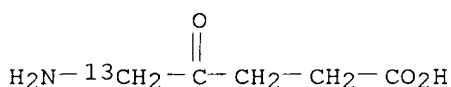
CODEN: JKXXAF

DOCUMENT TYPE: Patent

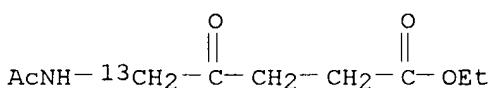
Searched by Barb O'Bryen, STIC 308-4291

LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	JP 62111954	A2	19870522	JP 1985-251070	19851109
AB	Stable <sup>13</sup> C-labeled aminolevulinic acid (I), useful as a pharmaceutical intermediate, is prepd. from a <sup>13</sup> C-labeled nitrile compd. A mixt. of 3-carbethoxypropionyl chloride and Cu <sup>13</sup> CN in MeCN was refluxed at 100.degree. in Ar to give EtO <sub>2</sub> CCH <sub>2</sub> CH <sub>2</sub> CO <sup>13</sup> CN which was treated with Zn powder in AcOH-Ac <sub>2</sub> O at 40.degree. under ultrasound to give 98% EtO <sub>2</sub> CCHCH <sub>2</sub> CO <sup>13</sup> CH <sub>2</sub> NHAc which was hydrolyzed to give I having >90% 5- <sup>13</sup> C.				
IT	<b>79503-87-0P</b> , Aminolevulinic acid (5- <sup>13</sup> C) RL: SPN (Synthetic preparation); PREP (Preparation) (prepn of, as pharmaceutical intermediate)				
RN	79503-87-0 CAPLUS				
CN	Pentanoic-5- <sup>13</sup> C acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)				



IT **113433-13-9P**, N-Ethyl-4-keto-5-<sup>13</sup>C-aminoacetopentanoate  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation)  
 (prepn. and hydrolysis of)  
 RN 113433-13-9 CAPLUS  
 CN Pentanoic-5-<sup>13</sup>C acid, 5-(acetylamino)-4-oxo-, ethyl ester (9CI) (CA INDEX NAME)



L16 ANSWER 26 OF 45 CAPLUS COPYRIGHT 2001 ACS

ACCESSION NUMBER: 1988:90998 CAPLUS

DOCUMENT NUMBER: 108:90998

TITLE: The preparation of radiolabeled porphyrins and their use in studies of photodynamic therapy

AUTHOR(S): Vernon, David I.; Brown, Stanley B.

CORPORATE SOURCE: Dep. Biochem., Univ. Leeds, Leeds, LS2 9JT, UK

SOURCE: Photochem. Photobiol. (1987), 46(5), 581-6

CODEN: PHCBAP; ISSN: 0031-8655

DOCUMENT TYPE: Journal

LANGUAGE: English

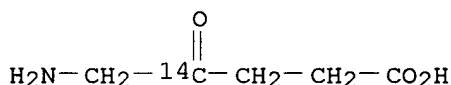
AB The use of radiolabeled HPD and DHE has potential importance in studies of the mechanism of localization of these compds. in tumors and their mode of action in promoting light-mediated cell damage. A no. of methods of prepn. of radiolabeled HPD and its components have been investigated. In a novel approach, methods were developed for producing <sup>14</sup>C- or <sup>3</sup>H-labeled protoporphyrin from photosynthetic algae. In this way, hematoporphyrin and HPD can be produced with much higher specific radioactivity than has hitherto been available. This radiolabeled material has been used in several studies related to photodynamic therapy. One application has been the precise detn. of the molar absorption coeff. of DHE (and other components of HPD) based on the fact that its specific radioactivity per porphyrin unit must be identical to that of the porphyrin from which it

Searched by Barb O'Bryen, STIC 308-4291

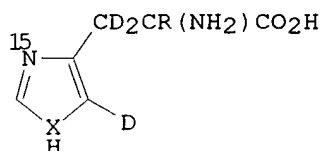
```

IT      7729-71-7, 5-Amino[4-14C]levulinic acid
        RL: BIOL (Biological study)
           (in carbon-14-labeled protoporphyrin IX and protoheme prepn.)
RN      7729-71-7  CAPLUS
CN      Pentanoic-4-14C acid, 5-amino-4-oxo- (9CI)  (CA INDEX NAME)

```

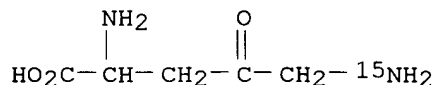


L16 ANSWER 27 OF 45 CAPLUS COPYRIGHT 2001 ACS  
ACCESSION NUMBER: 1988:6363 CAPLUS  
DOCUMENT NUMBER: 108:6363  
TITLE: Synthesis of selectively multi-labeled histidine with  
stable isotopes for study of histidinaemia by GLC-mass  
spectrometry  
AUTHOR(S): Furuta, Takashi; Kasuya, Yasuji; Takahashi, Hidenori;  
Baba, Shigeo  
CORPORATE SOURCE: Dep. Clin. Pharm., Tokyo Coll. Pharm., Hachioji,  
192-03, Japan  
SOURCE: J. Chem. Res., Synop. (1987), (3), 86-7  
CODEN: JRPSDC; ISSN: 0308-2342  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
OTHER SOURCE(S): CASREACT 108:6363  
GI



I

AB	Labeled histidines L-I (X = N, R = H) and DL-I (X = 15N, R = D) were prepd from 2,5-diamino-4-oxopentanoic acid for use as biol. and anal. internal stds.
IT	<b>111652-34-7P</b> RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation) (prepn. and deuteration of)
RN	111652-34-7 CAPLUS
CN	Ornithine-N5-15N, 4-oxo- (9CI) (CA INDEX NAME)



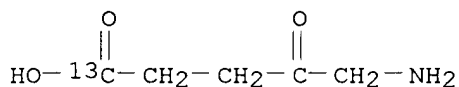
L16 ANSWER 28 OF 45 CAPLUS COPYRIGHT 2001 ACS  
ACCESSION NUMBER: 1987:81332 CAPLUS  
DOCUMENT NUMBER: 106:81332  
TITLE: Mechanistic studies on the phytylation and methylation  
Searched by Barb O'Bryen, STIC 308-4291

steps in bacteriochlorophyll a biosynthesis: an application of the oxygen-18-induced isotope effect in carbon-13 NMR

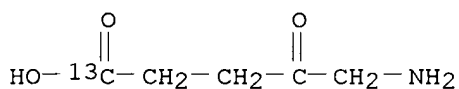
AUTHOR(S): Emery, Vincent C.; Akhtar, Muhammad  
 CORPORATE SOURCE: Dep. Biochem., Univ. Southampton, Southampton, SO9 3TU, UK  
 SOURCE: Biochemistry (1987), 26(4), 1200-8  
 CODEN: BICHAW; ISSN: 0006-2960  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English

AB The high-resoln.  $^{13}\text{C}$  NMR spectrum of bacteriochlorophyll a biosynthesized from  $[1-^{13}\text{C}, 1, 1, 4-^{18}\text{O}]-5\text{-aminolevulinic acid}$  by growing cells of *Rhodospseudomonas sphaeroides* has shown both the C-173 and C-133 resonances consist of 3 addnl. components upfield shifted from the 160- $^{13}\text{C}:^{16}\text{O}$  resonance. By comparison with the  $^{13}\text{C}$  NMR spectrum obtained for phytol acetate contg.  $^{13}\text{C}$  and  $^{18}\text{O}$  selectively in the ester linkage, these components have been identified as the bridge ( $-^{18}\text{O}-^{13}\text{C}:^{16}\text{O}$ ), nonbridge ( $-^{16}\text{O}-^{13}\text{C}:^{18}\text{O}$ ), and dual-labeled ( $-^{18}\text{O}-^{13}\text{C}:^{18}\text{O}$ ) isotopomers. These results suggest that both the ester bonds of bacteriochlorophyll a are produced by a carboxy-alkyl transfer process.

IT 98599-93-0P 106213-17-6P  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation) (prepn. and reaction of)  
 RN 98599-93-0 CAPLUS  
 CN Pentanoic-1- $^{13}\text{C}$  acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)



RN 106213-17-6 CAPLUS  
 CN Pentanoic-1- $^{13}\text{C}$  acid, 5-amino-4-oxo-, hydrochloride (9CI) (CA INDEX NAME)

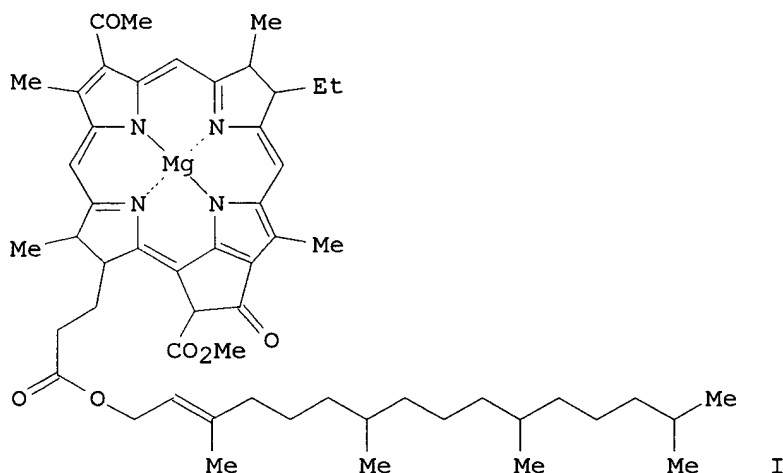


O HCl

L16 ANSWER 29 OF 45 CAPLUS COPYRIGHT 2001 ACS  
 ACCESSION NUMBER: 1985:557030 CAPLUS  
 DOCUMENT NUMBER: 103:157030  
 TITLE: Mechanistic studies on the phytylation step in bacteriochlorophyll a biosynthesis: an application of the oxygen-18 induced isotope effect in carbon-13 NMR spectroscopy

AUTHOR(S): Emery, Vincent C.; Akhtar, Muhammad  
 CORPORATE SOURCE: Dep. Chem., Univ. Southampton, Southampton, SO9 3TU, UK  
 SOURCE: J. Chem. Soc., Chem. Commun. (1985), (9), 600-1  
 CODEN: JCCCAT; ISSN: 0022-4936  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English  
 GI

Searched by Barb O'Bryen, STIC 308-4291



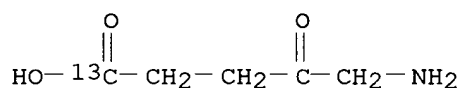
AB A  $^{13}\text{C}$  NMR spectral study showed that bacteriochlorophyll a (I) formed from  $\text{H}_2\text{NCH}_2\text{C}^{18}\text{O}(\text{CH}_2)_2\text{C}^{18}\text{O}_2\text{H}$  ( $\delta$ -aminolevulinic acid) in cultures of *Rhodospseudomonas sphaeroides* at 27.degree. contained 18O in both the bridge and nonbridge O of the phytol ester linkage. These results are in accord with the previously proposed phytylation mechanism in the biosynthesis of I (M. Akhtar, et al., 1980, 1984).

IT 98599-93-0

RL: BIOL (Biological study)  
(oxygen-18 labeling of)

RN 98599-93-0 CAPLUS

CN Pentanoic-1- $^{13}\text{C}$  acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)



L16 ANSWER 30 OF 45 CAPLUS COPYRIGHT 2001 ACS

ACCESSION NUMBER: 1983:157372 CAPLUS

DOCUMENT NUMBER: 98:157372

TITLE: A novel method for continuous monitoring of bilirubin production in unstressed rats

AUTHOR(S): Reichen, Juerg; Hoilien, Catherine; Sheldon, George F.; Kirshenbaum, Gerald

CORPORATE SOURCE: Sch. Med., Univ. Colorado, Denver, CO, 90262, USA

SOURCE: Am. J. Physiol. (1983), 244(3), G336-G340

CODEN: AJPHAP; ISSN: 0002-9513

DOCUMENT TYPE: Journal

LANGUAGE: English

AB A device is described for continuous infusion and monitoring of exhaled  $^{14}\text{CO}$  as a test of hepatic bilirubin prodn. in rats. A Silastic catheter, implanted into a jugular vein under light ether anesthesia, was protected with a spring shield and a cannula swivel. The animals were kept in a modified Bollman cage.  $\delta$ -[5- $^{14}\text{C}$ ]aminolevulinic acid, a heme precursor yielding  $^{14}\text{CO}$  upon breakdown of heme to bilirubin, was infused at a const. rate. Exhaled  $^{14}\text{CO}$  was oxidized to  $^{14}\text{CO}_2$  and collected in ethanolamine. The efficiency of the system averaged 97.8%. In untreated

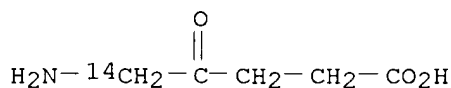
Searched by Barb O'Bryen, STIC 308-4291

animals,  $^{14}\text{CO}$  prodn. reached a plateau within 12 h; thereafter, it increased by 2.8%/day. The responsiveness of the system was tested by fasting the animals, which stimulated hepatic bilirubin prodn. Fasting increased  $^{14}\text{CO}$  prodn. by 32.8% (mean) after 72 h. This was assocd. with an increase in hepatic heme oxygenase activity (+45%) and a decrease in microsomal cytochrome P 450 content (-45%). The approach permits continuous monitoring of hepatic bilirubin prodn. without subjecting the animals to the stress of handling, restraint, or anesthesia. The method can easily be applied to other breath tests involving formation of  $^{14}\text{CO}_2$ .

IT 5976-91-0

RL: ANST (Analytical study)  
(in bilirubin formation by liver anal.)

RN 5976-91-0 CAPLUS

CN Pentanoic-5- $^{14}\text{C}$  acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)

L16 ANSWER 31 OF 45 CAPLUS COPYRIGHT 2001 ACS

ACCESSION NUMBER: 1981:585521 CAPLUS

DOCUMENT NUMBER: 95:185521

TITLE: The structure of factor III. A trimethyl  
isobacteriochlorin intermediate in the biosynthesis of  
vitamin B12

AUTHOR(S): Mueller, Gerhard; Gneuss, K. D.; Kriemler, H. P.;  
Irwin, Anthony J.; Scott, A. I.

CORPORATE SOURCE: Inst. Org. Chem. Biochem. Isotopenforsch., Univ.  
Stuttgart, Stuttgart, D-7000/1, Fed. Rep. Ger.

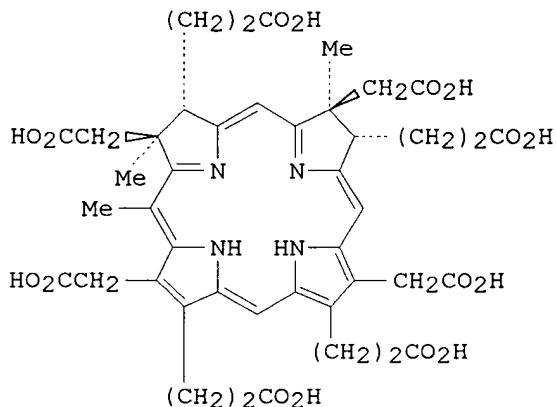
SOURCE: Tetrahedron, Suppl. (1981), (9), 81-90

CODEN: TETSAE; ISSN: 0563-2072

DOCUMENT TYPE: Journal

LANGUAGE: English

GI



I

AB The structure of Factor III, an intermediate in corrin formation in  
Propionibacterium shermanii, was detd. by  $^{13}\text{C}$  and  $^1\text{H}$  NMR anal. of a  
 $^{13}\text{C}$ -enriched sample to be I rather than a C-5 methylated  
Searched by Barb O'Bryen, STIC 308-4291

isobacteriochlorin as previously reported of (Batterby, A. R.; et al., 1977, 1978). In cell-free exts. of *Clostridium tetanomorphum* the conversion of Factor III to cobyrinic acid involves loss of C-20 together with the methionine-derived Me group attached in this position. The observations are discussed with ref. to the connection between urogen and corrin biosynthesis.

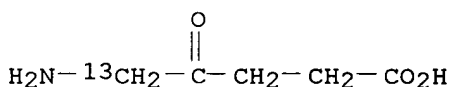
IT 79503-87-0

RL: RCT (Reactant)

(microbial reaction of, with labeled methionine, methylsirohydrochlorin by)

RN 79503-87-0 CAPLUS

CN Pentanoic-5-13C acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)



L16 ANSWER 32 OF 45 CAPLUS COPYRIGHT 2001 ACS

ACCESSION NUMBER: 1981:480056 CAPLUS

DOCUMENT NUMBER: 95:80056

TITLE: Synthesis of carbon-14-labeled 5-hydroxy-4-ketovaleric acid and 4,5-dioxovaleric acid

AUTHOR(S): Tschesche, Rudolf; Wirth, Wolfgang

CORPORATE SOURCE: Inst. Org. Chem. Biochem., Univ. Bonn, Bonn, D-5300/1, Fed. Rep. Ger.

SOURCE: J. Labelled Compd. Radiopharm. (1981), 18(3), 433-8

CODEN: JLCRD4; ISSN: 0362-4803

DOCUMENT TYPE: Journal

LANGUAGE: English

AB HOCH<sub>2</sub>CO(CH<sub>2</sub>)<sub>2</sub>14CO<sub>2</sub>H (I) was prepd. by Grignard reaction of 1-benzyloxy-4-bromo-2-butanone ethylene acetal with 14CO<sub>2</sub> and subsequent removal of the protecting groups. Deamination of H<sub>2</sub>NCH<sub>2</sub>14CO(CH<sub>2</sub>)<sub>2</sub>CO<sub>2</sub>H.HCl by HNO<sub>2</sub> gave HOCH<sub>2</sub>14CO(CH<sub>2</sub>)<sub>2</sub>CO<sub>2</sub>H. Oxidn. of I [Cu(OAc)<sub>2</sub>, H<sub>2</sub>O, under N, room temp., 3 days) gave the corresponding 4,5-dioxovaleric acid.

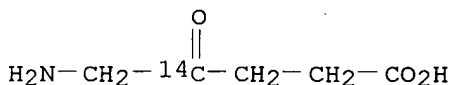
IT 16387-80-7

RL: RCT (Reactant)

(deamination of)

RN 16387-80-7 CAPLUS

CN Pentanoic-4-14C acid, 5-amino-4-oxo-, hydrochloride (9CI) (CA INDEX NAME)



● HCl

L16 ANSWER 33 OF 45 CAPLUS COPYRIGHT 2001 ACS

ACCESSION NUMBER: 1980:211263 CAPLUS

DOCUMENT NUMBER: 92:211263

TITLE: Investigation of a non-invasive method for measuring metabolic changes in obesity

AUTHOR(S): Vineyard, Michelle L.; Smith, John T.

CORPORATE SOURCE: Dep. Food Sci. Nutr. Food Syst. Adm., Univ. Tennessee, Knoxville, TN, USA

Searched by Barb O'Bryen, STIC 308-4291

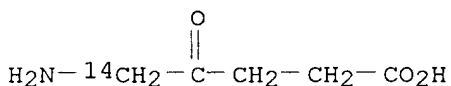
SOURCE: Tenn. Farm Home Sci., Prog. Rep. (1979), 112, 29-30  
CODEN: TFHSAT; ISSN: 0040-3229

DOCUMENT TYPE: Journal  
LANGUAGE: English

AB A method is described for measuring  $^{14}\text{CO}$  excretion following administration of  $\delta$ -aminolevulinic-5- $^{14}\text{C}$  acid in obese mice. Since  $\delta$ -aminolevulinic acid is a precursor for hemoprotein synthesis, esp. cytochrome P 450, the excretion of  $^{14}\text{CO}$  serves as an indicator of the activity of the hepatic mixed function oxidase system, which may be involved in obesity. Excreted  $^{14}\text{CO}$  was collected by a closed circulation system, oxidized to  $^{14}\text{CO}_2$  by  $\text{PdCl}_2$ , and the radioactivity counted. When Na pentobarbital, which causes an increase in cytochrome P 450, was administered, there was a large increase in  $^{14}\text{CO}$  excretion when the induction was for 3-6 days. Moreover, the obese mice excreted 26% less  $^{14}\text{CO}$  than the controls at 3-4 mo of age, and 47% less  $^{14}\text{CO}$  at 6-8 mo. Thus, the administration of  $\delta$ -aminolevulinic-5- $^{14}\text{C}$  acid and collection of  $^{14}\text{CO}$  indicated that obese mice had less cytochrome P 450.

IT **5976-91-0**  
RL: ANST (Analytical study)  
(in metabolic studies of obesity)

RN 5976-91-0 CAPLUS  
CN Pentanoic-5- $^{14}\text{C}$  acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)



L16 ANSWER 34 OF 45 CAPLUS COPYRIGHT 2001 ACS

ACCESSION NUMBER: 1978:503111 CAPLUS  
DOCUMENT NUMBER: 89:103111  
TITLE: A rapid, simple method for obtaining radiochemically pure hepatic heme

AUTHOR(S): Bonkowsky, Herbert Lloyd; Bement, William Jay; Erny, Raymond

CORPORATE SOURCE: Hepatol. Metab. Lab., VA Cent., White River Junction, Vt., USA

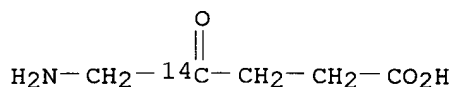
SOURCE: Biochim. Biophys. Acta (1978), 541(1), 119-23  
CODEN: BBACAQ; ISSN: 0006-3002

DOCUMENT TYPE: Journal  
LANGUAGE: English

AB A simple, rapid method for obtaining radiochem. pure heme synthesized in vivo in rat liver from  $\delta$ -aminolevulinate-4- $^{14}\text{C}$  has been devised, by modifying the procedure of H. L. Bonkowsky, et al. (1975). This method, in which the heme is extd. into  $\text{EtOAc}/\text{AcOH}$  and in which porphyrins are removed from the heme-contg. org. phase with  $\text{HCl}$  washes, does not require addn. of carrier heme. The new method gives heme recoveries better than and heme sp. activities identical to those obtained using the crystn. method. In this new method heme must be synthesized from  $\delta$ -aminolevulinate-4- $^{14}\text{C}$ ; it not satisfactory to use glycine-2- $^{14}\text{C}$  substrate because nonheme counts are isolated in the heme fraction.

IT **7729-71-7**  
RL: ANST (Analytical study)  
(carbon-14-labeled heme formation from, in liver, sepn. after)

RN 7729-71-7 CAPLUS  
CN Pentanoic-4- $^{14}\text{C}$  acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)



L16 ANSWER 35 OF 45 CAPLUS COPYRIGHT 2001 ACS

ACCESSION NUMBER: 1976:521317 CAPLUS

DOCUMENT NUMBER: 85:121317

TITLE: Quantitation of ineffective erythropoiesis from the incorporation of [15N]delta-aminolevulinic acid and [15N]-glycine into early labeled bilirubin

AUTHOR(S): Samson, Diana; Halliday, D.; Nicholson, D. C.; Chanarin, I.

CORPORATE SOURCE: MRC Clin. Res. Cent., Northwick Park Hosp., Harrow/Middlesex, Engl.

SOURCE: Br. J. Haematol. (1976), 34(1), 33-44  
CODEN: BJHEAL

DOCUMENT TYPE: Journal

LANGUAGE: English

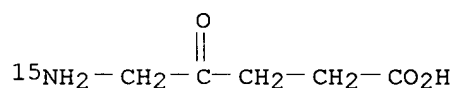
AB The incorporation of glycine-15N into early labeled bilirubin and Hb heme was measured in 4 hematol. normal subjects, using the clearance of bilirubin-14C to measure total bilirubin prodn. rate. Hepatic heme turnover was calcd. from the incorporation of .delta.-aminolevulinic-15N acid into early labeled bilirubin. From the exptl. data and previously published data in normal subjects a method is derived for the quantitation of ineffective erythropoiesis which can be applied to similar studies in patients with hematol. disorders.

IT 60556-69-6

RL: BIOL (Biological study)  
(in erythropoiesis detn.)

RN 60556-69-6 CAPLUS

CN Pentanoic acid, 5-(amino-15N)-4-oxo- (9CI) (CA INDEX NAME)



L16 ANSWER 36 OF 45 CAPLUS COPYRIGHT 2001 ACS

ACCESSION NUMBER: 1975:602810 CAPLUS

DOCUMENT NUMBER: 83:202810

TITLE: Formation of cobyrinic acid by means of a cell-free system from Clostridium tetanomorphum. Comparative examinations with carbon-14-labeled 5-aminolevulinate and carbon-14-labeled uroporphyrinogen

AUTHOR(S): Dauner, Hans O.; Mueller, Gerhard

CORPORATE SOURCE: Inst. Org. Chem., Biochem. Isotopenforsch, Univ. Stuttgart, Stuttgart, Ger.

SOURCE: Hoppe-Seyler's Z. Physiol. Chem. (1975), 356(9), 1353-8  
CODEN: HSZPAZ

DOCUMENT TYPE: Journal

LANGUAGE: German

AB Cell-free exts. from C. tetanomorphum, a microorganism which synthesizes corrins but no heme, converted both 5-aminolevulinate and uroporphyrinogen III into cobyrinic acid. Comparative examns. with 5-aminolevulinate-14C and uroporphyrinogen-14C yielded corresponding results. Cell-free exts. from C. tetanomorphum contained uroporphyrinogen III. To obtain good  
Searched by Barb O'Bryen, STIC 308-4291

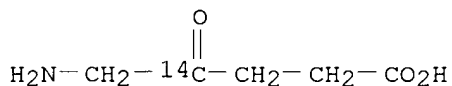
radiochem. yields it was therefore necessary to use substrates of high-specific radioactivity. A method for the prepn. of  $^{14}\text{C}$ -labeled uroporphyrin I-IV with high specific radioactivity is described.

IT **16387-80-7P**

RL: SPN (Synthetic preparation); PREP (Preparation)  
(prepn. of)

RN 16387-80-7 CAPLUS

CN Pentanoic-4- $^{14}\text{C}$  acid, 5-amino-4-oxo-, hydrochloride (9CI) (CA INDEX NAME)



● HCl

L16 ANSWER 37 OF 45 CAPLUS COPYRIGHT 2001 ACS

ACCESSION NUMBER: 1974:108498 CAPLUS

DOCUMENT NUMBER: 80:108498

TITLE: Biosynthesis of porphyrins and related macrocycles.  
II. Synthesis of  $\delta$ -amino[5- $^{13}\text{C}$ ]levulinic acid and [11- $^{13}\text{C}$ ]prophobilinogen. Incorporation of the latter into protoporphyrin IX

AUTHOR(S): Battersby, Alan R.; Hunt, Eric; McDonald, Edward; Moron, Jaqueline

CORPORATE SOURCE: Univ. Chem. Lab., Cambridge, Engl.

SOURCE: J. Chem. Soc., Perkin Trans. 1 (1973), (23), 2917-22  
CODEN: JCPRB4

DOCUMENT TYPE: Journal

LANGUAGE: English

GI For diagram(s), see printed CA Issue.

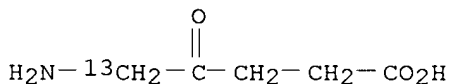
AB  $\text{H}_2\text{N}^{13}\text{CH}_2\text{CO}(\text{CH}_2)_2\text{CO}_2\text{H} \cdot \text{HCl}$  and [11- $^{13}\text{C}$ ]prophobilinogen lactam (I) were prepd. in 57 and 43% overall yield from  $\text{OCH}(\text{CH}_2)_2\text{CO}_2\text{Et}$  and the methyl pyrrole (II, R = H, R1 = Et, R2 =  $\text{CO}_2\text{Et}$ ), resp. Hydrolysis of I gave II (R =  $\text{NH}_2$ , R1 = R2 = H) incorporation of which into protoporphyrin IX by *Euglena gracilis* gave a product equally labeled at the meso-C atoms.

IT **52065-79-9P**

RL: SPN (Synthetic preparation); PREP (Preparation)  
(prepn. of)

RN 52065-79-9 CAPLUS

CN Pentanoic-5- $^{13}\text{C}$  acid, 5-amino-4-oxo-, hydrochloride (9CI) (CA INDEX NAME)



○ HCl

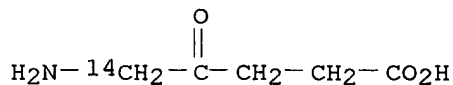
L16 ANSWER 38 OF 45 CAPLUS COPYRIGHT 2001 ACS

ACCESSION NUMBER: 1973:526756 CAPLUS

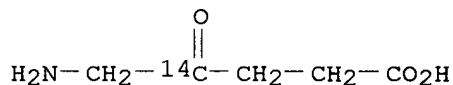
DOCUMENT NUMBER: 79:126756

TITLE: Carbon-14 labeled amino acids, amino keto acids, and amino ketones of interest in biology  
Searched by Barb O'Bryen, STIC 308-4291

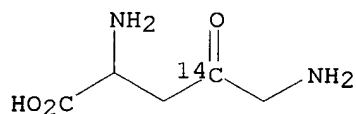
AUTHOR(S): Beaucourt, J. P.  
 CORPORATE SOURCE: Univ. Paris, Orsay, Fr.  
 SOURCE: Report (1972), FRNC-TH-322, 274 pp. Avail.: Dep. NTIS  
 (U. S. Sales Only)  
 From: Nucl. Sci. Abstr. 1973, 28(3), 5274  
 DOCUMENT TYPE: Report  
 LANGUAGE: French  
 AB Four methods of synthesizing 4-<sup>14</sup>C- or 5-<sup>14</sup>C-.delta.-aminolevulinic acid as well as the prepn. of 4-<sup>14</sup>C-homoserine, 4-<sup>14</sup>C-methionine, 4-<sup>14</sup>C-.gamma.-butyrolactone, 7-<sup>14</sup>C-adrenalone, 4-<sup>14</sup>C-4-ketoornithine, and <sup>14</sup>C-labeled keto esters, amino ketones, ketones, and keto acids were described.  
 IT 5976-91-0P 7729-71-7P 43189-68-0P  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (prepn. of)  
 RN 5976-91-0 CAPLUS  
 CN Pentanoic-5-<sup>14</sup>C acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)



RN 7729-71-7 CAPLUS  
 CN Pentanoic-4-<sup>14</sup>C acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)



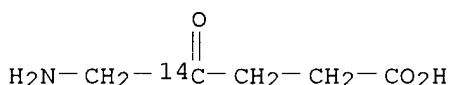
RN 43189-68-0 CAPLUS  
 CN Ornithine-4-<sup>14</sup>C, 4-oxo- (9CI) (CA INDEX NAME)



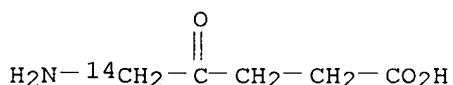
L16 ANSWER 39 OF 45 CAPLUS COPYRIGHT 2001 ACS  
 ACCESSION NUMBER: 1973:94541 CAPLUS  
 DOCUMENT NUMBER: 78:94541  
 TITLE: Method for the biological preparation and thin-layer chromatographic purification of [<sup>14</sup>C]-protochlorophyllide a  
 AUTHOR(S): Ellsworth, R. K.; Nowak, C. A.  
 CORPORATE SOURCE: Coll. Arts Sci., State Univ. New York, Plattsburgh, N. Y., USA  
 SOURCE: Anal. Biochem. (1973), 51(2), 656-62  
 CODEN: ANBCA2  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English  
 AB A method is described for the synthesis of protochlorophyllide-<sup>14</sup>C (I) in wheat seedlings (Triticum aestivum) and purifn. by a 2-step thin-layer chromatog. procedure. Seeds were germinated in vermiculite and grown for 5 days at 24.degree. in darkness. Seedlings were then grown for 5 days in a 0.02M phosphate buffer, at pH 7.7, contg. .delta.-aminolevulinic  
 Searched by Barb O'Bryen, STIC 308-4291

acid-4-14C (II) (sp. activity 18.3 .mu.Ci/.mu.mole). The 10-day old etiolated seedlings were then macerated and extd. The Metalloporphyrins-14C were extd. and a crude ext. carrier of I, obtained from a parallel wheat not exposed to II, was added. Purifn. of crude I to radiochem. and spectrometric homogeneity was accomplished in 2 steps: thin-layer chromatog. on silica gel G plates and extn. of the eluate with Me2CO and Et2O. The 2nd purifn. step was done on sucrose thin-layer plates, scraping the bands directly into Et2O.

IT 7729-71-7  
 RL: ANST (Analytical study)  
 (in protochlorophyllide a prepn.)  
 RN 7729-71-7 CAPLUS  
 CN Pentanoic-4-14C acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)

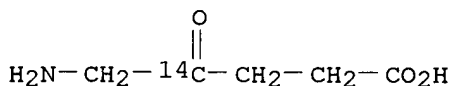


L16 ANSWER 40 OF 45 CAPLUS COPYRIGHT 2001 ACS  
 ACCESSION NUMBER: 1972:113498 CAPLUS  
 DOCUMENT NUMBER: 76:113498  
 TITLE: New methods of synthesis of .delta.-aminolevulinic acid-4-14C and -5-14C/.delta.-aminolevulinic acid-4-14C or -5-14C  
 AUTHOR(S): Pichat, L.; Beaucourt, J. P.; Herbert, M.  
 CORPORATE SOURCE: C.E.N., Saclay, Fr.  
 SOURCE: Radioisotopy (1971), 12(4), 519-34  
 CODEN: RAISBC  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English  
 AB Shorter and more efficient methods of prepn. of .delta.-aminolevulinic acid (I) are proposed. The first method starts from glycine-[1-14C]. Phthalylglycyl chloride is condensed at 0.degree. in ether and 1,2-dimethoxyethane with a lithium deriv. made from BuLi and tris(trimethylsilyl) 1,1,2-ethanetricarboxylate. After hydrolysis of the nonisolated intermediate, and two chromatographic purifications the overall yield of pure I-[4-14C] is 60%. When applied to glycine-[2-14C] the method provides I-[5-14C]. It is also shown to be a general method of prepn. of .gamma.-, .delta.-, .epsilon.-oxo acids and methyl ketones. The second method is based on carbonation with 14CO2 of the Grignard reagent where the potential carboxyl group is protected as 2,4,10-trioxadamantane, to give the half ortho succinic ester. The latter is then transformed into the corresponding chloride which is treated by the Arndt-Eistert method in order to provide the bromo ketone. After phthalimidation, the intermediate is hydrolyzed to I-[4-14C]. The overall yield based on 14CO2 is 30%. Self-decompn. rates under various storage conditions are tabulated for I-[4-14C] and -[2,3-T].  
 IT 5976-91-0P 7729-71-7P  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (prepn. of)  
 RN 5976-91-0 CAPLUS  
 CN Pentanoic-5-14C acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)

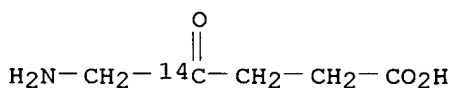


Searched by Barb O'Bryen, STIC 308-4291

RN 7729-71-7 CAPLUS  
 CN Pentanoic-4-14C acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)



IT 16387-80-7  
 RL: PRP (Properties)  
 (stability of)  
 RN 16387-80-7 CAPLUS  
 CN Pentanoic-4-14C acid, 5-amino-4-oxo-, hydrochloride (9CI) (CA INDEX NAME)



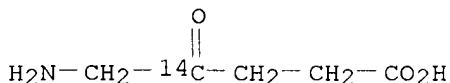
⊙ HCl

L16 ANSWER 41 OF 45 CAPLUS COPYRIGHT 2001 ACS  
 ACCESSION NUMBER: 1968:95278 CAPLUS  
 DOCUMENT NUMBER: 68:95278  
 TITLE: Synthesis of .delta.-aminolevulinic acid. Application to the introduction of carbon-14 and of tritium  
 AUTHOR(S): Loheac, Joel  
 CORPORATE SOURCE: C. E. N., Saclay, Fr.  
 SOURCE: Commis. Energ. At. [Fr.], Rapp. (1967), No. CEA-R 3063, 84 pp.  
 CODEN: CMEAAQ  
 DOCUMENT TYPE: Journal  
 LANGUAGE: French  
 GI For diagram(s), see printed CA Issue.  
 AB Incorporation of 14C and T into .delta.-aminolevulinic acid  
 HO2CCH2CH2COCH2NH2 (I) was considered of special interest due to the biol. importance of the compd. Special effort was devoted to the incorporation of 14C into position 4 of I, because this C-atom participates in the formation of pyrrole rings and protoporphyrin. The method produced a yield of 30% and consisted of the following steps: carboxylation using 14C of BrMgCH2CH2CH:CH2 produced allyl-acetic acid. Using ClCOCOCl the acid chloride was obtained which with CH2N2 and HCl produced ClCH214COCH2CH2CH:CH2 which was condensed with K phthalimide in dimethyl-formamide. The resulting II was oxidized and hydrolyzed to I. For the incorporation of 14C into positions 1 and 2, phthalimidoacetylacetate was treated with BrCH214CO2H in CH2N2. Acid hydrolysis produced 14C in position 1 of I but not in position 2. Incorporation of T into positions 2 and 3 succeeded. To avoid exchange reactions during tritiation of I which would lead to products with labile T and no biol. significance, Me .delta.-phthalimidodehydrolevulinate (III, R = Me) was used. This compd. was produced either by the Wittig reaction or from furfurylamine according to the method of Marei and Raphael and modified by Sparatore and Cuming. Omitting hydrogenation, a hitherto unknown compd., .delta.-phthalimidodehydrolevulinic acid (III, R = H) was obtained, which after hydrolysis with HCl produced I. 70 references.  
 IT 7729-71-7P  
 Searched by Barb O'Bryen, STIC 308-4291

RL: SPN (Synthetic preparation); PREP (Preparation)  
(prepn. of)

RN 7729-71-7 CAPLUS

CN Pentanoic-4-14C acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)



L16 ANSWER 42 OF 45 CAPLUS COPYRIGHT 2001 ACS

ACCESSION NUMBER: 1968:94983 CAPLUS

DOCUMENT NUMBER: 68:94983

TITLE: Preparation of carbon-14-labeled molecules. VII.  
Synthesis of .delta.-aminolevulinic acid labeled with  
carbon-14 and tritium

AUTHOR(S): Herbert, Michel; Pichat, Louis

SOURCE: Bull. Inf. Sci. Tech., Commis. Energ. At. (Fr.)  
(1967), No. 118, 42-4  
CODEN: BUIAAN

DOCUMENT TYPE: Journal

LANGUAGE: French

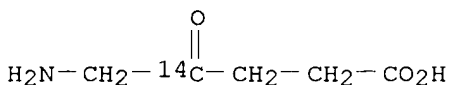
AB Various methods of labeling .gamma.-aminolevulinic acid with 14C, 3H, and  
15N are described.

IT **7729-71-7P 13855-42-0P**

RL: SPN (Synthetic preparation); PREP (Preparation)  
(prepn. of)

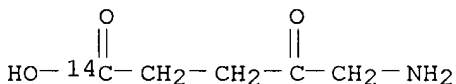
RN 7729-71-7 CAPLUS

CN Pentanoic-4-14C acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)



RN 13855-42-0 CAPLUS

CN Levulinic-1-14C acid, 5-amino- (8CI) (CA INDEX NAME)



L16 ANSWER 43 OF 45 CAPLUS COPYRIGHT 2001 ACS

ACCESSION NUMBER: ✓ 1967:443377 CAPLUS

DOCUMENT NUMBER: 67:43377

TITLE: Improvement in the method of synthesis of  
.delta.-amino-levulinic acid-4-14C hydrochloride

AUTHOR(S): Mitta, Aldo E. A.; Ferramola, A. M.; Sancovich, H. A.;  
Grinstein, Moises

CORPORATE SOURCE: Com. Nacl. Energia At., Buenos Aires, Argent.

SOURCE: J. Labelled Compd. (1967), 3(1), 20-3

CODEN: JLCAAI

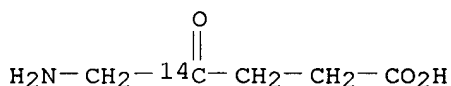
DOCUMENT TYPE: Journal

LANGUAGE: English

AB .delta.-Aminolevulinic acid-4-14C was prepd. from phthalimide using K14CN  
as the radioactive starting material. This method avoids the less  
Searched by Barb O'Bryen, STIC 308-4291

practical synthesis via glycine-14C and its condensation with phthalic anhydride to afford phthalylglycine-1-14C whose yield, based on K14CN, is thus considerably improved. 15 references.

IT **16387-80-7P**  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (prepn. of)  
 RN 16387-80-7 CAPLUS  
 CN Pentanoic-4-14C acid, 5-amino-4-oxo-, hydrochloride (9CI) (CA INDEX NAME)



● HCl

L16 ANSWER 44 OF 45 CAPLUS COPYRIGHT 2001 ACS  
 ACCESSION NUMBER: 1967:65013 CAPLUS  
 DOCUMENT NUMBER: 66:65013  
 TITLE: New methods of synthesis of 14C and tritium labeled

.delta.-aminolevulinic acid. II.  
 .delta.-Aminolevulinic -1-14C or -2-14C acid from  
 sodium acetate-2-14C or -1-14C and ethyl  
 phthalimidoacetyl acetate

AUTHOR(S): Pichat, Louis; Loheac, Joel; Herbert, Michel;  
 Chatelain, G.

CORPORATE SOURCE: Serv. Mol. Marquees, C.E.N., Saclay, Fr.  
 SOURCE: Bull. Soc. Chim. Fr. (1966), (10), 3271-3

CODEN: BSCFAS

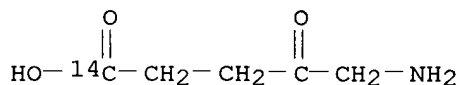
DOCUMENT TYPE: Journal

LANGUAGE: French

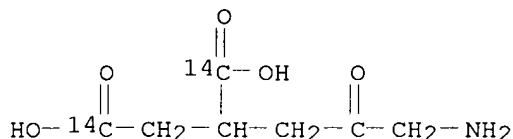
GI For diagram(s), see printed CA Issue.

AB cf. CA 66, 54979g. Treatment of Et (phthalimidoacetyl)acetylacetate (Ia) with NH4OH in EtOH gave Et phthalimidoacetylacetate (I), m. 111-12.degree. (95% EtOH). NaOAc-1-14C was converted to bromoacetic acid and then, with CH2N2 in 1,2-dimethoxyethane, to Me bromoacetate-1-14C (II). I and II were condensed using NaH in 1,2-dimethoxyethane and the product hydrolyzed to give crude .delta.-aminolevulinic 1-14C acid. The yield from NaOAc was 55%. A secondary product (15%) obtained was shown to be 3-(2-aminoacetyl)pentane-1,5-dioic acid which was probably formed by the reaction of 2-mols. of II with the di-Na deriv. of I.

IT **13855-42-0P 13855-43-1P**  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (prepn. of)  
 RN 13855-42-0 CAPLUS  
 CN Levulinic-1-14C acid, 5-amino- (8CI) (CA INDEX NAME)



RN 13855-43-1 CAPLUS  
 CN Glutaric-1,5-14C2 acid, 3-glycyl-, hydrochloride (8CI) (CA INDEX NAME)



O HCl

L16 ANSWER 45 OF 45 CAPLUS COPYRIGHT 2001 ACS

ACCESSION NUMBER: 1967:54979 CAPLUS

DOCUMENT NUMBER: 66:54979

TITLE: New methods of synthesis of carbon-14 and tritium-labeled .delta.-aminolevulinic acid. I.  
 .delta.-Aminolevulinic-4-14C acid with allylacetic-1-14C and as intermediate

AUTHOR(S): Pichat, Louis; Loheac, Joel; Herbert, Michel

CORPORATE SOURCE: Serv. Mol. Marquees C.E.N., Saclay, Fr.

SOURCE: Bull. Soc. Chim. Fr. (1966), (10), 3268-70

CODEN: BSCFAS

DOCUMENT TYPE: Journal

LANGUAGE: French

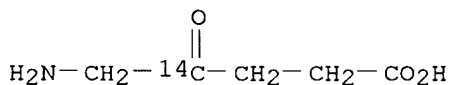
GI For diagram(s), see printed CA Issue.

AB Carbonation of the Mg deriv. of 1-bromo-3-butene with  $^{14}\text{CO}_2$  (from  $\text{Ba}^{14}\text{CO}_3$ ) gave 90% allylacetic-1- $^{14}\text{C}$  acid as the K salt. The salt was evapd. and dried at 50.degree. in vacuo (Hg vapor). Oxalyl chloride was distd. in and the mixt. left overnight, and then distd. into an  $\text{Et}_2\text{O}$  soln. of  $\text{CH}_2\text{N}_2$  cooled with liquid N. After 2 hrs. at room temp., HCl was transferred to the mixt. to give 1-chloro-5-hexen-2-one-2- $^{14}\text{C}$  which with K phthalide in dimethyl-formamide gave 50% (based on  $\text{Ba}^{14}\text{CO}_3$ ) 1-phthalimido-5-hexen-2-one-2- $^{14}\text{C}$  (I), m. 70.degree.. Ozonolysis gave .delta.-phthalimidolevulinic-4- $^{14}\text{C}$  acid which on acid hydrolysis gave crude .delta.-aminolevulinic-4- $^{14}\text{C}$  acid. This was purified by chromatography on Dowex 50W-12. The overall yield was 30% and the specific activity was 3 mc./millimole.

IT 7729-71-7P

RL: SPN (Synthetic preparation); PREP (Preparation)  
 (prepn. of)

RN 7729-71-7 CAPLUS

CN Pentanoic-4- $^{14}\text{C}$  acid, 5-amino-4-oxo- (9CI) (CA INDEX NAME)

FILE 'CAOLD' ENTERED AT 16:45:17 ON 16 JAN 2001

USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.

PLEASE SEE "HELP USAGETERMS" FOR DETAILS.

COPYRIGHT (C) 2001 AMERICAN CHEMICAL SOCIETY (ACS)

FILE COVERS 1907-1966

FILE LAST UPDATED: 01 May 1997 (19970501/UP)

This file contains CAS Registry Numbers for easy and accurate  
 Searched by Barb O'Bryen, STIC 308-4291

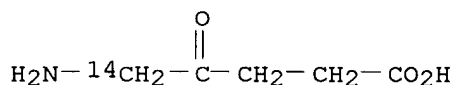
substance identification. Title keywords, authors, patent assignees, and patent information, e.g., patent numbers, are now searchable from 1907-1966. TIFF images of CA abstracts printed between 1907-1966 are available in the PAGE display formats.

This file supports REGISTRY for direct browsing and searching of all substance data from the REGISTRY file. Enter HELP FIRST for more information.

L3 STR  
L4 SCR 2039  
L6 SCR 2045 OR 2046  
L8 35 SEA FILE=REGISTRY SSS FUL L3 AND L4 NOT L6  
L11 STR  
L12 STR  
L13 STR  
L15 29 SEA FILE=REGISTRY SUB=L8 SSS FUL (L3 NOT ((L11 OR L12 OR L13)))  
L17 4 SEA FILE=CAOLD ABB=ON L15

=> diall hitstr l17 1-4; fil hom

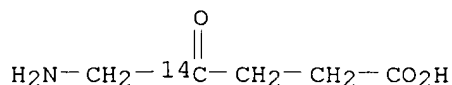
L17 ANSWER 1 OF 4 CAOLD COPYRIGHT 2001 ACS  
ACCESSION NUMBER: CA62:13034e CAOLD  
TITLE: synthesis of 5-aminolevulinic-5-14C acid and  
4,5-dioxovaleric-5-14C acid  
AUTHOR NAME: Gnuchev, N. V.; Neiman, L. A.; Poznanskaya, A. A.  
INDEX TERM: 1114-86-9 1187-95-7 2781-46-6 **2781-47-7**  
3055-20-7  
IT **2781-47-7**  
RN 2781-47-7 CAOLD  
CN Pentanoic-5-14C acid, 5-amino-4-oxo-, hydrochloride (9CI) (CA INDEX NAME)



⊗ HCl

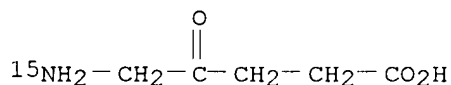
L17 ANSWER 2 OF 4 CAOLD COPYRIGHT 2001 ACS  
ACCESSION NUMBER: CA52:256b CAOLD  
TITLE: synthesis of isotope tagged .delta.-aminolevulinic acid-HCl  
- (II) .delta.-aminolevulinic acid-4-Cl4-HCl  
AUTHOR NAME: Pichat, Louis; Herbert, M.  
PATENT NO. KIND DATE  
-----  
PI GB 778423  
INDEX TERM: **16387-80-7** 114985-46-5 120087-04-9  
IT **16387-80-7**  
RN 16387-80-7 CAOLD  
CN Pentanoic-4-14C acid, 5-amino-4-oxo-, hydrochloride (9CI) (CA INDEX NAME)

Searched by Barb O'Bryen, STIC 308-4291



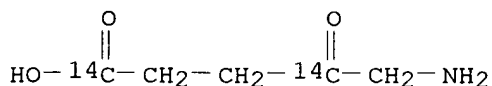
O HCl

L17 ANSWER 3 OF 4 CAOLD COPYRIGHT 2001 ACS  
 ACCESSION NUMBER: CA51:7360f CAOLD  
 TITLE: synthesis of .delta.-aminolevulinic acid-HCl labeled with N15  
 AUTHOR NAME: Pichat, Louis; Hucleux, M.; Herbert, M.  
 INDEX TERM: 53856-93-2 109311-38-8 110357-63-6 **116571-80-3**  
 IT **116571-80-3**  
 RN 116571-80-3 CAOLD  
 CN Pentanoic acid, 5-(amino-15N)-4-oxo-, hydrochloride (9CI) (CA INDEX NAME)



O HCl

L17 ANSWER 4 OF 4 CAOLD COPYRIGHT 2001 ACS  
 ACCESSION NUMBER: CA51:544e CAOLD  
 TITLE: biosynthesis of the porphyrinlike moiety of vitamin B12  
 AUTHOR NAME: Shemin, David; Corcoran, J. W.; Rosenblum, C.; Miller, I. M.  
 INDEX TERM: **116571-81-4**  
 IT **116571-81-4**  
 RN 116571-81-4 CAOLD  
 CN Levulinic-1,4-14C2 acid, 5-amino- (6CI) (CA INDEX NAME)



=&gt; fil uspatfull; d que nos 118; fil hom

FILE 'USPATFULL' ENTERED AT 16:46:16 ON 16 JAN 2001  
 CA INDEXING COPYRIGHT (C) 2001 AMERICAN CHEMICAL SOCIETY (ACS)

FILE COVERS 1971 TO PATENT PUBLICATION DATE: 16 Jan 2001 (20010116/PD)  
 FILE LAST UPDATED: 16 Jan 2001 (20010116/ED)  
 HIGHEST PATENT NUMBER: US6175957  
 CA INDEXING IS CURRENT THROUGH 16 Jan 2001 (20010116/UPCA)  
 ISSUE CLASS FIELDS (/INCL) CURRENT THROUGH: 16 Jan 2001 (20010116/PD)  
 REVISED CLASS FIELDS (/NCL) LAST RELOADED: Sep 2000  
 USPTO MANUAL OF CLASSIFICATIONS THESAURUS ISSUE DATE: Sep 2000  
 Searched by Barb O'Bryen, STIC 308-4291

>>> Page images are available for patents from 1/1/1997. Current <<<  
>>> week patent text is typically loaded by Thursday morning and <<<  
>>> page images are available for display by the end of the day. <<<  
>>> Image data for the /FA field are available the following week. <<<

>>> Complete CA file indexing for chemical patents (or equivalents) <<<  
>>> is included in file records. A thesaurus is available for the <<<  
>>> USPTO Manual of Classifications in the /NCL, /INCL, and /RPCL <<<  
>>> fields. This thesaurus includes catchword terms from the <<<  
>>> USPTO/MOC subject headings and subheadings. Thesauri are also <<<  
>>> available for the WIPO International Patent Classification <<<  
>>> (IPC) Manuals, editions 1-6, in the /IC1, /IC2, /IC3, /IC4, <<<  
>>> /IC5, and /IC (/IC6) fields, respectively. The thesauri in <<<  
>>> the /IC5 and /IC fields include the corresponding catchword <<<  
>>> terms from the IPC subject headings and subheadings. <<<

This file contains CAS Registry Numbers for easy and accurate  
substance identification.

L3 STR  
L4 SCR 2039  
L6 SCR 2045 OR 2046  
L8 35 SEA FILE=REGISTRY SSS FUL L3 AND L4 NOT L6  
L11 STR  
L12 STR  
L13 STR  
L15 29 SEA FILE=REGISTRY SUB=L8 SSS FUL (L3 NOT ((L11 OR L12 OR  
L13)))  
L18 0 SEA FILE=USPATFULL ABB=ON L15

FILE 'HOME' ENTERED AT 16:46:18 ON 16 JAN 2001